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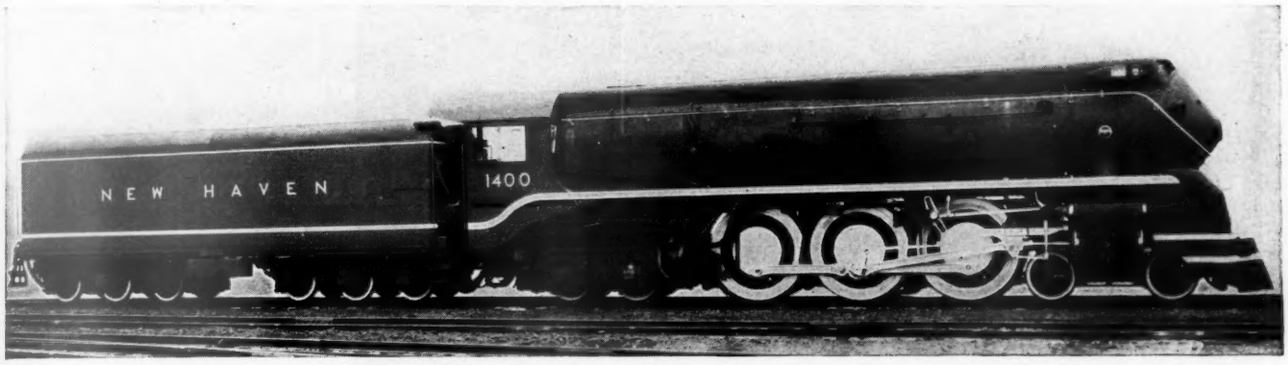


New York, New Haven & Hartford high-speed passenger locomotive

New Haven

Streamline Locomotives

Baldwin-built 4-6-4 type passenger engines have 80-in. drivers. The total weight on drivers is 193,000 lb. and the tractive force, 44,000 lb. The ten locomotives are intended to handle a large part of the mainline through passenger service

THE New York, New Haven & Hartford has recently received ten streamline 4-6-4 type passenger locomotives from the Baldwin Locomotive Works. These locomotives, to be known as the Shore Line type, are designed for high-speed service, and with capacity sufficient to handle passenger trains of 15 cars on fast schedules.

These locomotives have a total weight on drivers of 193,000 lb., with a combined heating surface of 4,857 sq. ft. and a grate area of 77.1 sq. ft. The cylinders are 22 in. by 30 in. diameter and the driving wheels, 80 in. diameter. With a boiler working pressure of 285 lb. per sq. in., the tractive force rating is 44,000 lb.

The Boiler

The boiler is of the conical type and the horizontal mud ring is supported by four sliding furnace bearers. The working pressure is 285 lb., but it is designed for a maximum working pressure of 300 lb. The barrel sheets, the wrapper sheet, the back head and throat sheet are of nickel steel. The firebox sheets are of deoxidized steel produced by the silicon-aluminum process. The firebox is 132 in. long by 84⅛ in. wide at the grate and includes a 42-in. combustion chamber. The tubes are 18 ft. long. The Type A superheater includes an American multiple throttle in the header.

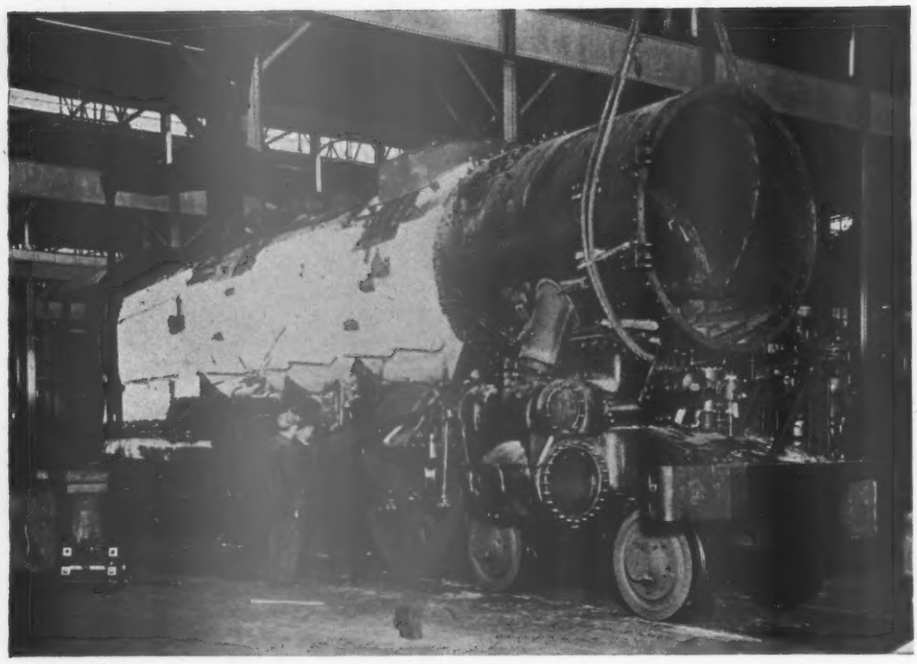
The firebox sheets are completely welded. Seal welding is also employed at the mud-ring corners, at the lower ends of the vertical wrapper-sheet seams, at the ends of longitudinal barrel seams and behind pad locations. Alco flexible staybolts are applied in the breaking zones and there is a complete installation in the water space around the combustion chamber and on the throat sheet.

The firebox is fitted with Firebar grates and coal is fed by a Standard Type HT stoker, the engine of which is located in a compartment in the left front corner of the tender. The ash pans are of cast steel. Other boiler appliances include the Hancock Turbo-Injector, the Barco Type F4a low-water alarm and the Dri Steam steam separator. The locomotives are fitted with the Master Mechanics' front end.

Frames and Running Gear

These locomotives are of rugged design and include many modern details. The foundation is an engine-bed casting, of which the cylinders and saddle, the main reservoir and various attachment brackets are an integral part. The running gear of these locomotives consists of the Boxpok driving wheels mounted on axles of carbon-vanadium steel. The journals of five locomotives are fitted with Timken roller-bearing driving boxes and the journals of the other five with SKF roller-bearing driving boxes. The crank pins, as well as the main and side rods, are also of carbon-vanadium steel. Advantage has been taken of the physical properties of this material in a 10-per cent increase in connecting-rod working stress over that normal for carbon steel. Floating bushings are fitted in the back end of the main rod and in the main side-rod connection. The outer bushings are of gun iron, with bronze inner bushings.

The engine and trailer trucks are General Steel Castings type. The front truck is fitted with the constant-resistance centering device. The lateral displacement has



Wheeling one of the locomotives in the erecting shop

an initial resistance of 40 per cent and a constant resistance of 33⅓ per cent. This truck has inboard bearings. The trailer truck has an initial and constant lateral resistance of 15 per cent. Both trucks are fitted with American Steel Foundries roller-bearing wheel-and-axle assemblies with SKF bearings. The cylinders are an integral part of the bed casting and all cylinder heads are steel, cast separately. The piston valves are 11 in. in diameter. The rear valve chamber heads are cast steel; for front heads, however, the material is cast iron.

On five of the locomotives the pistons are of Baldwin design fitted with Hunt-Spiller gun-iron bull rings and Duplex packing rings, while on the other five locomotives the piston heads are the Locomotive Finished Material type with bronze rings. Hunt-Spiller Duplex sectional type valve rings and gun-iron valve and cylinder bushings are fitted on all of the locomotives. The single-bar guide and crosshead are of the multi-ledge type.

Steam distribution is effected by the Walschaert valve motion controlled by the Barco Type M-1 power reverse gear. With the small valve diameter the load on the parts is reduced to a minimum and the valve-motion presents an unusually light appearance. The link trunnions are mounted in needle type roller bearings.

Each locomotive has two force-feed lubricators. On five of the locomotives Nathan DV4 20-pint lubricators are installed and on the others 24-pint Detroit Model A. The right lubricator dispenses valve oil and that on the left side is for car oil.

The five feeds from the right lubricator lead to the cylinders, steam chest and the stoker engine. Five feeds lead from the left side lubricator. Three of these lead to the driving-box pedestals, the oil being distributed to each pair of pedestals through a four-way divider; one feed, using a four-way divider, lubricates the main guides, and one feed, also through a divider, lubricates the valve-stem guides. A Westinghouse mechanical lubricator is furnished for the air compressor. Alemite lubrication is provided for the furnace bearers, front truck center casting, and the spring rigging and the brake rigging on the locomotive and tender.

The Tender

The tender is built-up on a General Steel Castings water-bottom frame. The frame is arranged to furnish access to the rear of the stoker feed trough from underneath the tender.

The tender tank is of riveted construction. The principal materials of construction are Cor-Ten steel plates and structural sections of copper-bearing steel. In the coal space, however, wrought-iron plates are used.

The tender trucks are of the six-wheel type, of cast-steel construction, with 6½-in. by 12-in. journals. Isothermos journal boxes are used. The wheels are 36 in.

in diameter, of rolled steel on eight tenders and cast steel on the other two tenders. The trucks are fitted with Simplex unit-cylinder clasp brakes.

The locomotives are equipped with Westinghouse No. 8ET air brakes, operating on all wheels, except the engine truck. They are also fitted with cab signals, furnished by the Union Switch & Signal Company on five locomotives and by the General Railway Signal Company on the other five.

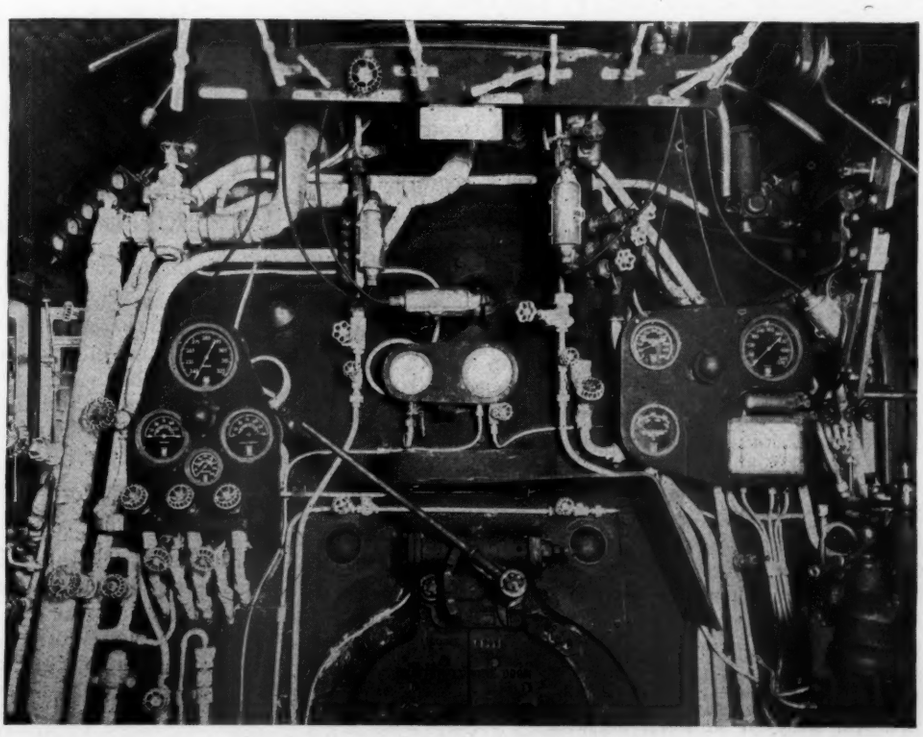
The Streamlining

The locomotives present a clean-cut appearance. All projections above the top of the boiler are housed within a shrouding which is flush with the top of the cab at the rear and with the top of the stack at the front. The boiler front is enclosed within a conical shrouding, in the apex of which is the headlight. The space between the smokebox and the front bumper is completely enclosed, as is also the pilot. The locomotive and tender are finished in black with striping of aluminum paint or stainless-steel. The large disc centers of the Boxpok driving wheels and the rims and tires are also finished in aluminum. There is a 6-in. stainless-steel strip edging the running boards. The air-brake radiator pipes are located over the top of the engine bed so that the sides of the locomotive are free from unsightly lines.

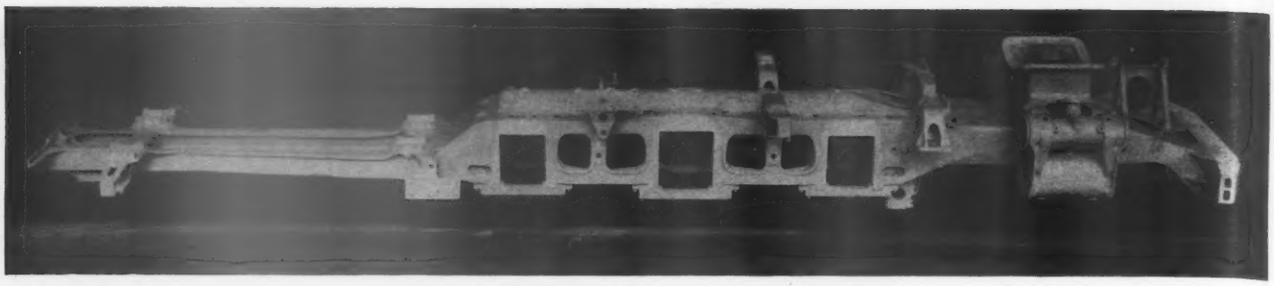
The smokebox is closed with the usual type of hinged front with a central door opening. At the base of the

General Dimensions, Weights and Proportions of the N.Y. N.H. & H. 4-6-4 Type Passenger Locomotives

Railroad	N. Y. N. H. & H.
Builder	Baldwin Locomotive Works
Type of locomotive	4-6-4 (Streamline)
Road class	1—5
Road numbers	1400—1409
Date built	1937
Service	Passenger
Dimensions:	
Height to top of stack, ft. and in.	15—4
Height to center of boiler, ft. and in.	10—6
Width overall, in.	124
Cylinder centers, in.	89
Weights in working order, lb.:	
On drivers	193,000
On front truck	71,500
On trailing truck	100,800
Total engine	365,300
Tender	332,000
Wheel bases, ft. and in.:	
Driving	14—0
Rigid	14—0
Engine, total	40—1
Engine and tender, total	84—10
Wheels, diameter outside tires, in.:	
Driving	80
Front truck	36
Trailing truck	42
Engine:	
Cylinders, number, diameter and stroke, in.	22 x 30
Valve gear, type	Walschaert
Valves, piston type, size, in.	11
Maximum travel, in.	7½
Steam lap, in.	1 1/16
Exhaust clearance, in.	1/8
Lead, in.	3/16
Boiler:	
Type	Conical
Steam pressure, lb. per sq. in.	285
Diameter, first ring, inside, in.	82 7/16
Diameter, largest, outside, in.	93
Firebox, length, in.	132
Firebox, width, in.	84 1/4
Height mud ring to crown sheet, back, in.	84 1/8
Height mud ring to crown sheet, front, in.	97 9/16
Combustion chamber length, in.	42
Thermic syphons, number	3
Tubes, number and diameter, in.	199—2¼
Flues, number and diameter, in.	48—5½
Length over tube sheets, ft. and in.	18—0
Fuel	Soft coal
Stoker	Standard Type HT
Grate type	Firebar
Grate area, sq. ft.	77.1
Heating surfaces, sq. ft.:	
Firebox and comb. chamber	341
Thermic syphons	139
Firebox, total	480
Tubes and flues	3,335
Evaporative, total	3,815
Superheating (Type A)	1,042
Combined evap. and superheat	4,857
Feedwater heater, type	Hancock Turbo Injector
Tender:	
Style or type	Water bottom
Water capacity, U. S. gal.	18,000
Fuel capacity, tons	16
Trucks	6-wheel
Journals, dia. and length, in.	6½ x 12
General Data, estimated:	
Rates tractive force, lb.	44,000
Weight Proportions:	
Weight on drivers ÷ weight, engine, per cent	52.9
Weight on drivers ÷ tractive force	43.9
Weight of engine ÷ comb. heat surface	75.2
Boiler Proportions:	
Firebox h.s. per cent comb. h.s.	9.8
Tube-flue h.s. per cent comb. h.s.	68.4
Superheat surface per cent comb. h.s.	21.8
Firebox h.s. ÷ grate area	6.2
Tube-flue h.s. ÷ grate area	43.2
Superheat. surface ÷ grate area	13.5
Comb. h.s. ÷ grate area	62.9
Tractive force ÷ grate area	570.7
Tractive force ÷ comb. h.s.	9.06
Tractive force x dia. drivers ÷ comb. h.s.	724.7



The cab interior presents an orderly arrangement of piping



The bed casting of the New Haven streamline locomotives

cone, the front-end shrouding is welded continuously to the smokebox front and will swing out with it. The apex portion of the cone is a separate piece which is hinged inside and held in place by four clamps. By releasing the clamps it can be swung to one side to give access to the front-end door.

The enclosed space under the front-end conceals the 8½-in. cross-compound compressor, the bell and the heater portion of the Turbo-Injector. The coupler is hinged vertically and when swung back to one side is concealed by a hinged dropdoor in the pilot shrouding.

Back of the front end, the principal feature of the streamlining is the shrouding which encloses all of the customary projections above the top of the boiler. This is mounted above the usual boiler jacket, is 5 ft. 8 in. in width, and up to the top clearance line in height. This shrouding is built-up on a series of transverse frames of light flat sections, stiffened at the corners with gussets which are welded in place. Light angles are applied longitudinally to the under side of the sheathing. From a point about 3 ft. ahead of the cab to the rear of the smoke lifter a width of 3 ft. on the top of the housing is covered with Diamondette foot plate. Wells are provided for the safety valves, and a suitable hatch furnishes access to the sand box. In addition to the sand box this shrouding conceals the dome, the low-water alarm and the single saturated-steam turret. The smoke lifter, which completely encloses the stack, has louver openings in front and a wide horizontal slot in the top of the casing at the rear of the stack.

The principal dimensions and weights are shown in the accompanying table.

U. P. to use Steamotive Units for

Turbo-Electric Locomotive*

Two light-weight boilers of wide-range capacity designed by Babcock & Wilcox with control apparatus by the Bailey Meter Company for a 5,000 hp. turbo-electric locomotive being built by the General Electric Company

Two light-weight steam generating units each with a rating of 2,500 hp. and with an output of 40,000 lb. of steam per hr. at a pressure of 1,500 lb. per sq. in. and a temperature of 950 deg. F. has been built by the Babcock & Wilcox Co. for a turbo-electric locomotive which is being built by the General Electric Co. for the Union Pacific. The control apparatus for the unit is furnished by the Bailey Meter Co. This unit is called "Steamotive" and is so designed that steam generation can be controlled automatically to respond quickly to wide variations in load, which feature is required to meet locomotive power demands.

The locomotive will be a double-cab unit with a 5,000 hp. rating and will be used to haul 1,000-ton trains such as the Union Pacific "Challenger" or the "Los Angeles Limited" over the Los Angeles-Omaha route. The locomotive will be streamlined, practically smokeless, and provided with equipment for air conditioning. It is expected that it will attain speeds of 110 m.p.h. on level track. Electric power will drive traction motors constructed on the usual type of electric-locomotive design.

The objects to be attained in the construction of this complete portable steam power plant are: (1) High steam pressure and temperature; (2) minimum weight and size per unit of steam produced; (3) wide range of capacity with ability of the unit to respond quickly to wide variations in load conditions; (4) adaptability to wide range of fuels; (5) completely coordinated auxiliaries; (6) completely coordinated automatic control, and (7) simple design, constructed in sizes small enough to be portable.

Following preliminary work done jointly by the Babcock & Wilcox Company, General Electric Company and Bailey Meter Company to confirm the possibilities of the Steamotive units, a developmental steam-generating unit was built and put in operation to perfect the design of the various component parts under actual operating conditions. The developmental Steamotive unit was assembled in the General Electric works at Schenectady, N. Y., during the latter part of 1934. The Steamotive boiler was designed and built by the Babcock & Wilcox Company, at Barberton, Ohio. It was oil-fired and designed for an output of 21,000 lb. of steam per hr. at a pressure of 1,500 lb. and a temperature of 1,050

* Abstract of paper presented by E. G. Bailey of the Babcock & Wilcox Company, A. R. Smith of the General Electric Company, and P. S. Dickey of the Bailey Meter Company before the 1936 annual meeting of the American Society of Mechanical Engineers.

deg. F. leaving the superheater, later changed to 900 deg. F. These specifications conformed to the requirements of a turbo-electric locomotive.

The Steamotive auxiliary set was designed and built by General Electric Company. These auxiliaries, geared together as one turbine-driven unit, consist of a feed pump which delivers 25,000 lb. of water per hour at a pressure of 2,000 lb.; a blower for 30,000 lb. air per hour at a pressure of 60 in. of water; a fuel-oil pump; and a lubricating-oil pump.

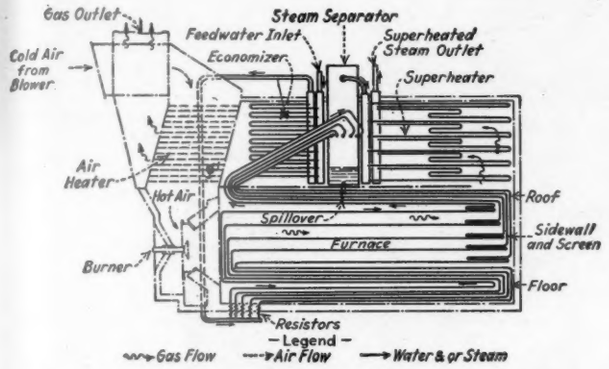


Fig. 1—Flow diagram of the developmental Steamotive unit

The meters and complete automatic control, designed and built by the Bailey Meter Company, coordinate the auxiliaries and the supply of fuel, air and feedwater to control steam output, pressure and temperature, together with complete automatic ignition and safety equipment.

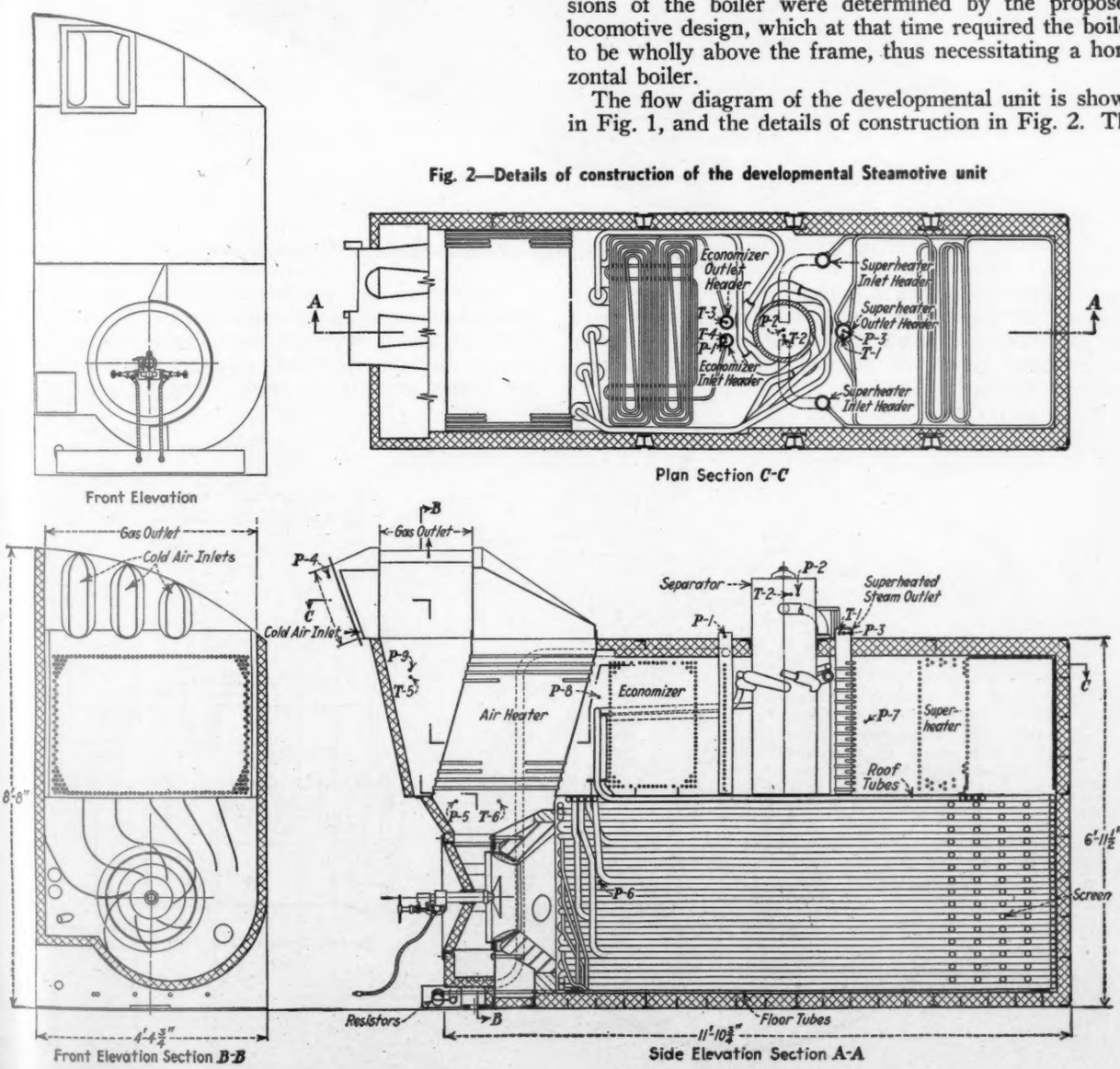
No serious defects were encountered in any of this equipment. During tests the complete unit operated 950 hrs., much of which time was continued maximum rating with long periods under extremely variable load conditions such as would be encountered in regular locomotive road service. The combustion of oil exceeded 400,000 B.t.u. per cu. ft. per hr. on peaks and 375,000 B.t.u. under continuous load. The unit operated over a range of output of 10 to 1 under complete automatic control. This Steamotive unit is now in commercial service in the Lynn Works of the General Electric Company.

Installation of Developmental Steamotive Unit

The first developmental Steamotive unit was assembled at the Schenectady Works of the General Electric Company for test. The intention was that two similar units would be installed in the cab of the 5,000-hp. Union Pacific steam-electric locomotive. The shape and dimensions of the boiler were determined by the proposed locomotive design, which at that time required the boiler to be wholly above the frame, thus necessitating a horizontal boiler.

The flow diagram of the developmental unit is shown in Fig. 1, and the details of construction in Fig. 2. The

Fig. 2—Details of construction of the developmental Steamotive unit



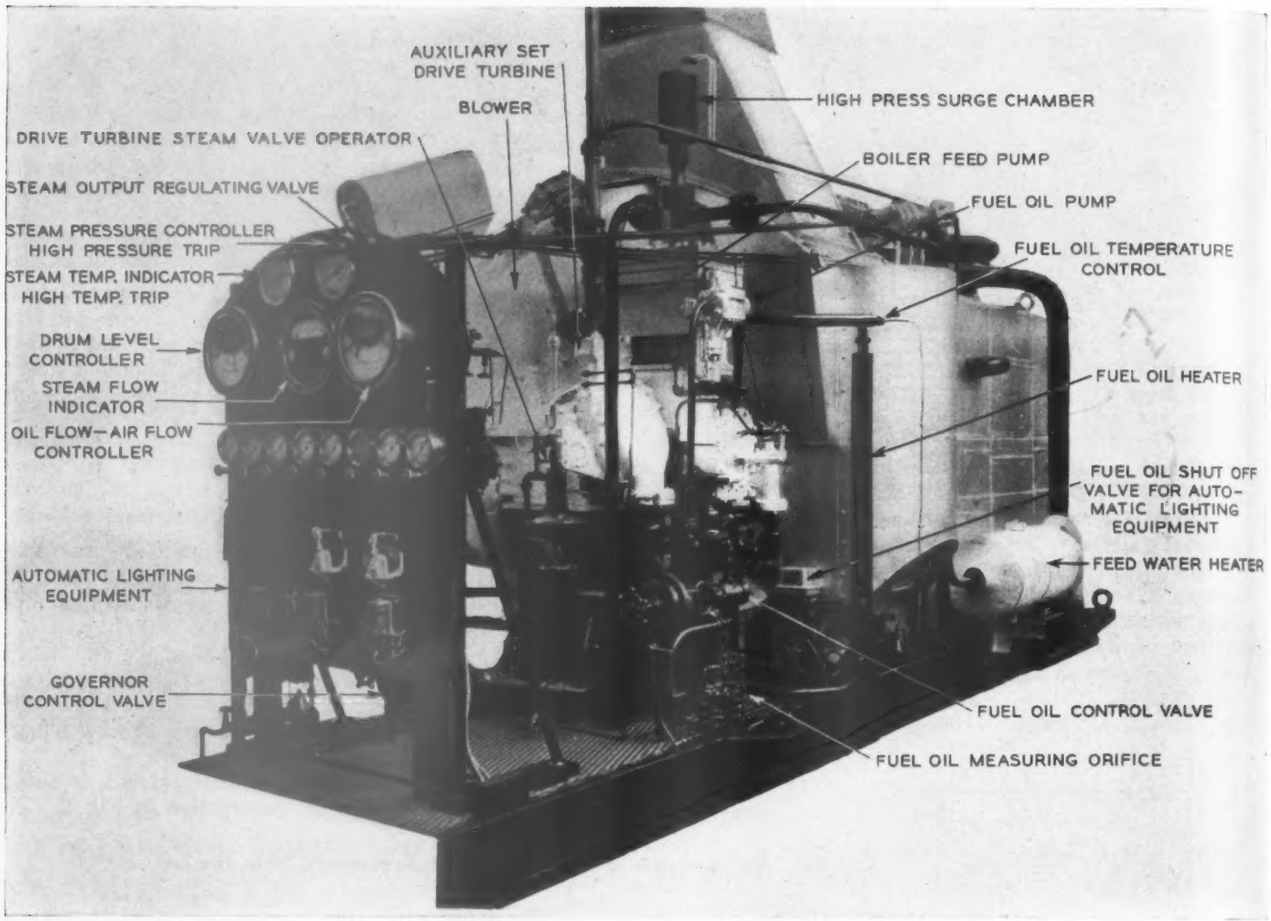
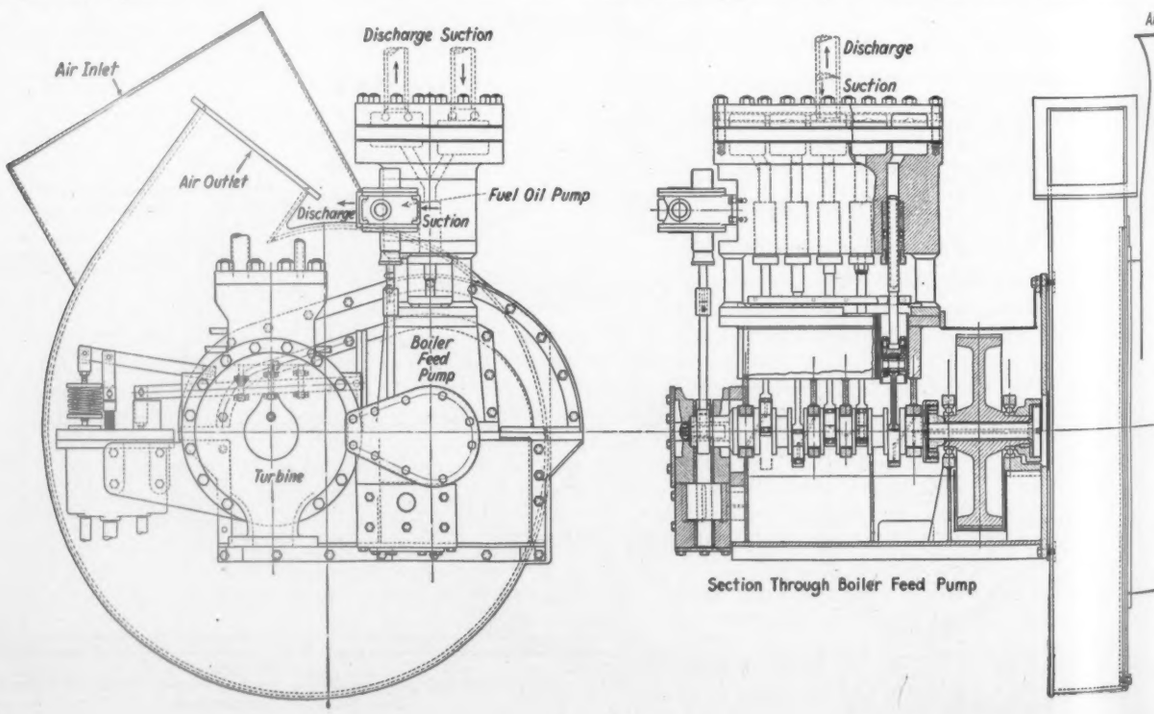


Fig. 3—General arrangement of equipment on the developmental Steamotive unit

general appearance and arrangement of equipment constituting the Steamotive unit in its final condition during the later stages of test at Schenectady and as operating at the Lynn Works of the General Electric Company today is shown in Fig. 3.

From the burner the flame and gases pass horizontally through the completely water-cooled furnace, thence up and back with a 180-deg. turn into the superheater, flowing around the separator, through the economizer and air heater and up the stack. The air for combustion



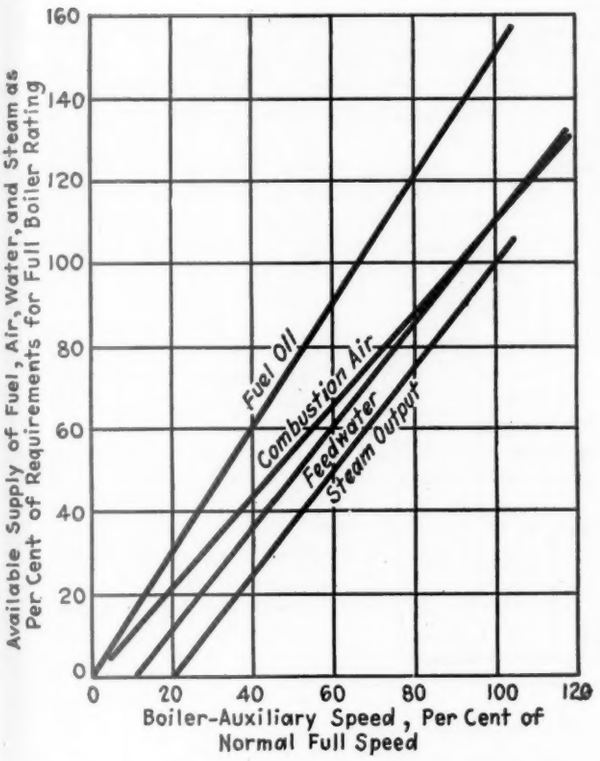


Fig. 4—Available supply of fuel, air, water and steam

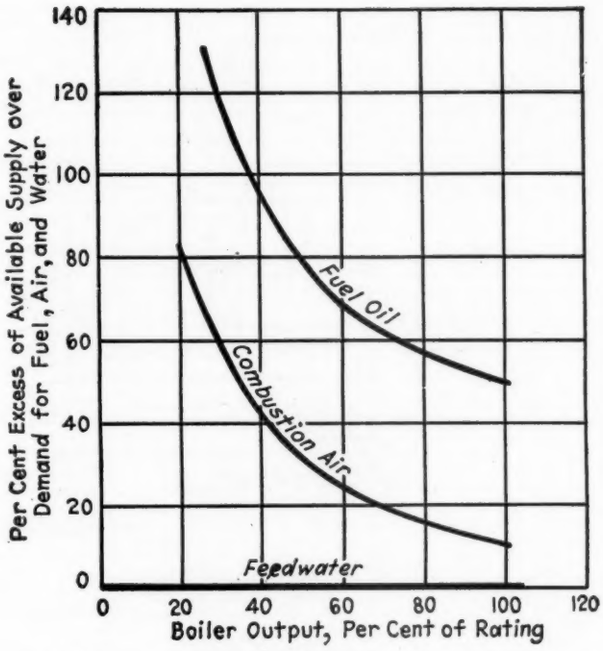


Fig. 5—Excess of available supply of oil, air, and feedwater at various ratings

leaves the blower at relatively high pressure, passing through lanes intersecting the stack and down around the air-heater tubes to the oil burner. There is no induced-draft fan, the blower forcing the air through the burner and furnace under pressure.

The feedwater enters the economizer inlet header, and, after leaving the outlet header, is divided into five circuits, all five of which form the floor, sides, and roof of the furnace as well as the two sets of loops forming the boiler screen. All the steam is generated in these five furnace and boiler circuits and enters the separator with a surplus of about 400 lb. of water per hr. in each circuit. From the separator the dry steam goes through the superheater and directly to the main turbine. The water from the separator is called the "spillover," and it passes through a heat exchanger to the hot well where it mixes with the condensate and is re-fed to the boiler.

Description of Boilers

Burner—The burner is of a special, short-barrel,

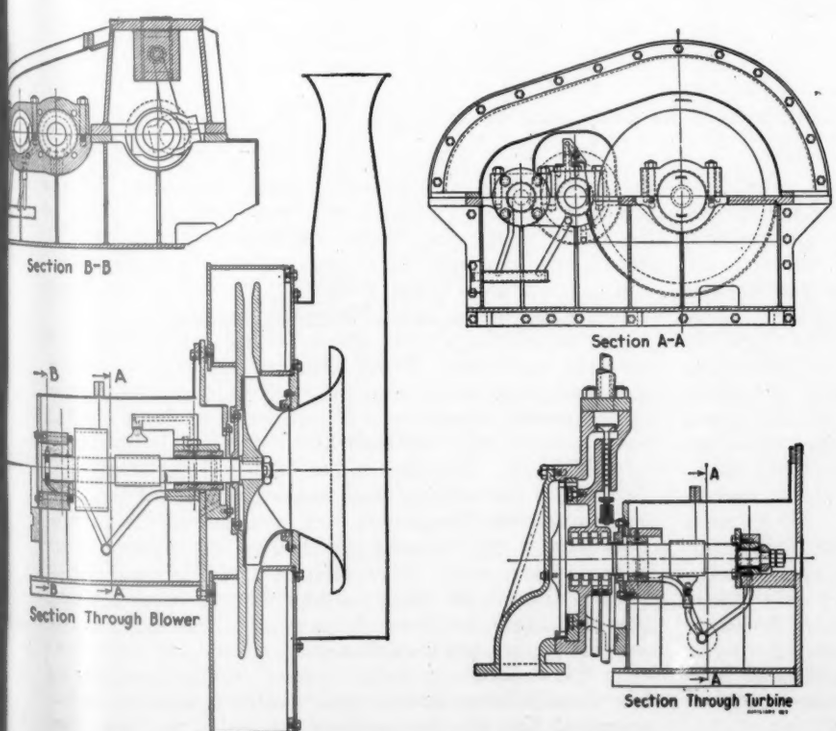
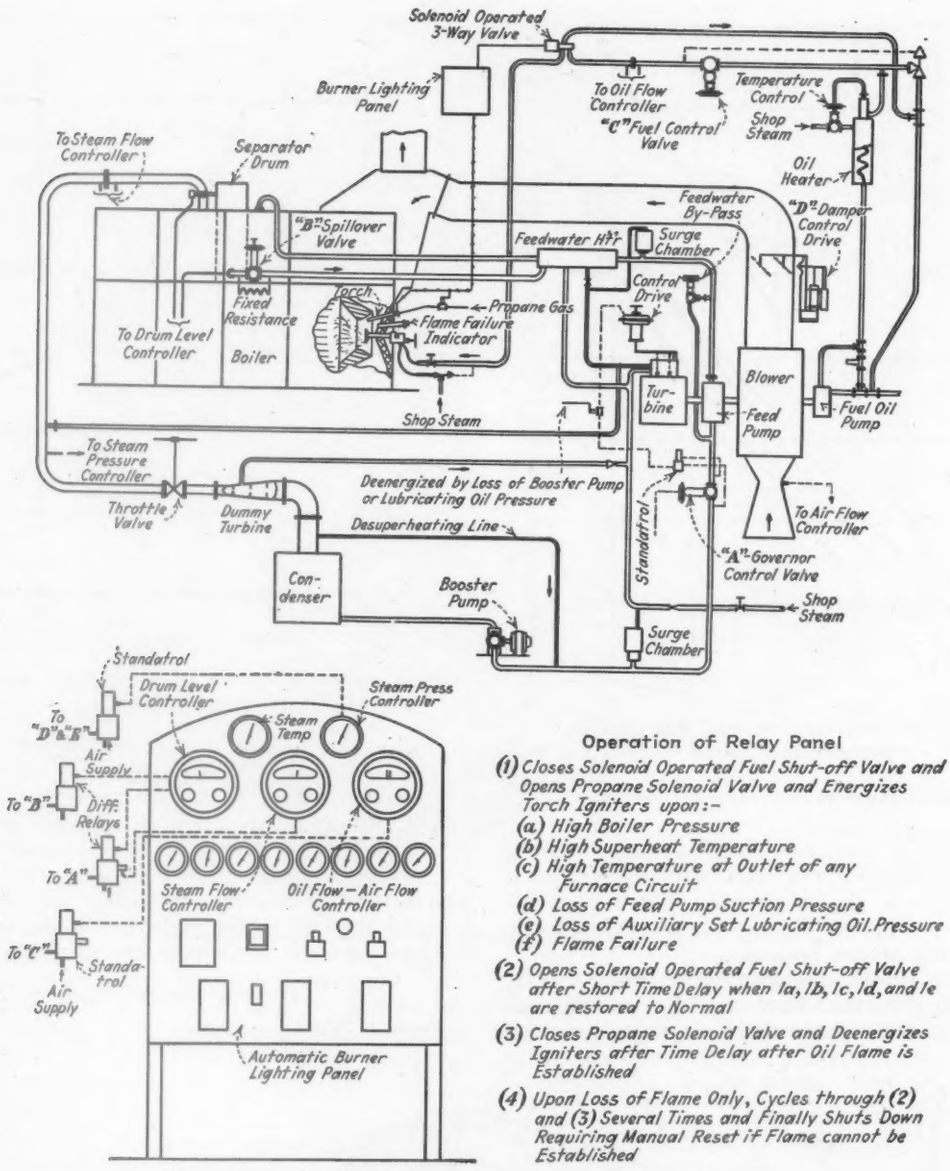


Fig. 6—The auxiliary set which consists of a feed pump, a positive-displacement blower for condensing air, and a fuel pump of the positive-displacement type. These three units are driven by a single variable-speed steam turbine



Operation of Relay Panel

(1) Closes Solenoid Operated Fuel Shut-off Valve and Opens Propane Solenoid Valve and Energizes Torch Igniters upon:–
- (a) High Boiler Pressure
- (b) High Superheat Temperature
- (c) High Temperature at Outlet of any Furnace Circuit
- (d) Loss of Feed Pump Suction Pressure
- (e) Loss of Auxiliary Set Lubricating Oil Pressure
- (f) Flame Failure

(2) Opens Solenoid Operated Fuel Shut-off Valve after Short Time Delay when 1a, 1b, 1c, 1d, and 1e are restored to Normal

(3) Closes Propane Solenoid Valve and Deenergizes Igniters after Time Delay after Oil Flame is Established

(4) Upon Loss of Flame Only, Cycles through (2) and (3) Several Times and Finally Shuts Down Requiring Manual Reset if Flame cannot be Established

Fig. 7—Diagrammatic layout of the developmental Steamotive unit

steam-atomizing, wide-range design. Guide vanes are provided to secure even distribution of the air to the burner. A pilot gas burner is provided for ignition, and is fed with propane gas stored in portable cylinders. A photoelectric flame-failure indicator is located in the burner box. This cell "sees" the flame through the opening between the burner throat and the impeller plate.

Furnace—The furnace is approximately 3 ft. 6 in. wide and 3 ft. 6 in. high inside the tubes and 7 ft. 6 in. long from the burner wall to the boiler screen tubes. The furnace volume is 90.4 cu. ft. The only refractory in the furnace is in the burner wall. The floor, sides, and roof of the furnace are formed by closely spaced tubes. There are five circuits in parallel in the furnace and boiler screen. The five circuits in the floor, side walls, and roof are connected in such a way as to balance as nearly as possible the heat input to each of the five combined circuits. The length of each floor circuit is 92 ft. 9 in. The average length of each wall circuit is about 183 ft. 6 in., and the average length of each roof circuit is about 49 ft., giving a total average length of each furnace circuit of approximately 325 ft.

Superheater—Due to the removal of excess surface the superheater occupies only about one third of the available space. The roof, rear wall, and side walls of the cavity in the rear of the superheater are lined with closely spaced superheater tubes forming a radiant section, the purpose being primarily to protect the inner casing plates from excessive gas temperature.

The superheater tubes are of KA2S alloy steel (18 per cent chromium, 8 per cent nickel), supported by alloy-steel rods hung from the roof with springs to take up differential expansion. The superheater inlet headers are of seamless carbon steel and the outlet header is of forged KA2S. Except for the inlet and outlet ends of the headers are within the casing and uninsulated.

Economizer—The economizer consists of 29 vertical rows formed by flat coils which give the equivalent of 18 horizontal rows. The coils are hung from the roof by alloy rods in the same way as the superheater. The inlet and outlet headers are inside the casing, and are made from seamless carbon-steel tubes. A tube connects the economizer outlet header to the five furnace floor circuits below the burner. Coiled resistor tubes are connected between the economizer outlet and the floor circuit inlets to introduce a definite pressure drop to in-

sure equal water distribution to each furnace circuit.

All tube connections are made by the fusion-welded process and each circuit is continuous without flanged or expanded connections. All tubes are strength-welded to headers and drums. The tubes and separator drum are designed for a factor of safety of five.

Air Heater—The air heater is made up of 1,515 tubes, 2 ft. 4 in. long, and the rows are spaced on 1-in. horizontal and $^{15}/_{16}$-in. vertical centers staggered. The tube ends are welded into the steel tube sheets. The gas flows inside the tubes and the air cross-flows outside. The air connection at the front of the boiler crosses the gas outlet to the air-heater inlet by means of three streamlined ducts. The contour of the gas outlet corresponds to that of the locomotive roof.

Heating Surface—The boiler heating surface is as follows: Furnace projected surface, 112.3 sq. ft.; boiler-screen convection surface, 115.9 sq. ft.; superheater projector radiant surface, 30.5 sq. ft.; superheater convection surface, 127.8 sq. ft.; and air heater, 578 sq. ft.

Separating Drum—The separating drum is located in the top of the boiler extending through the top casing 13⅝ in. with the bottom near the furnace roof plate. The drum is supported from structural work in the top

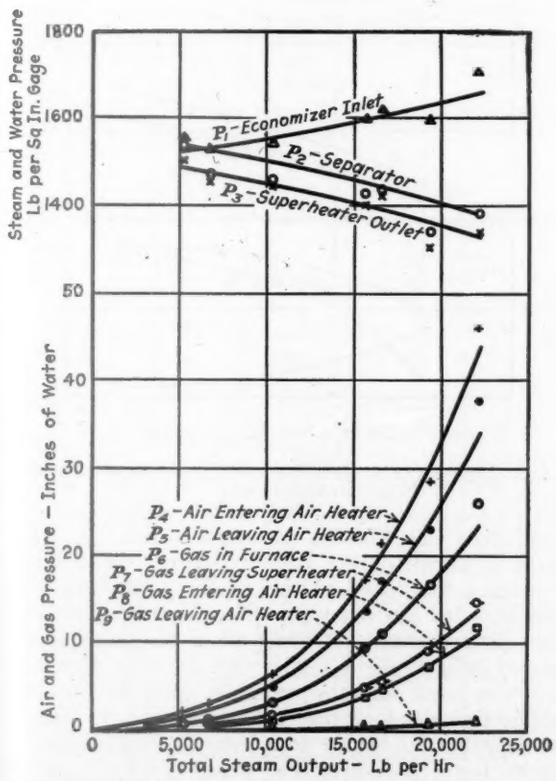


Fig. 8—Performance data showing variation of air, gas, steam and water pressures at various locations in the boiler—Letters refer to pressure-measurement locations shown in Fig. 2

casing. The furnace roof plate is attached to the bottom of the drum as well as the superheater and economizer headers for additional support. The inlet connections from the five furnace circuits enter the drum tangentially, with the ends of the tubes flattened. The two steam-outlet connections are located 180 deg. apart with the center line 18¼ in. above the center line of the outlet connections.

Boiler Casing—The casing and structural work was designed for a static pressure of 60 in. of water. It is necessary that the casing remain gas tight against this pressure and it was decided to make the outer casing tight by all-welded construction. The outer casing plates are of carbon steel and the inner plates of heat-resisting alloy. The outer plates also form an integral part of the strength members welded to six vertical I-beam and four angle buckstay columns. The casing and supports were designed for a shock load endways and a side sway or turn-over loading two and one-half times the static load.

Auxiliary Set

In order to save space and complexity of control and improve the efficiency of the boiler auxiliary drive to the highest degree, it was agreed that a combined drive

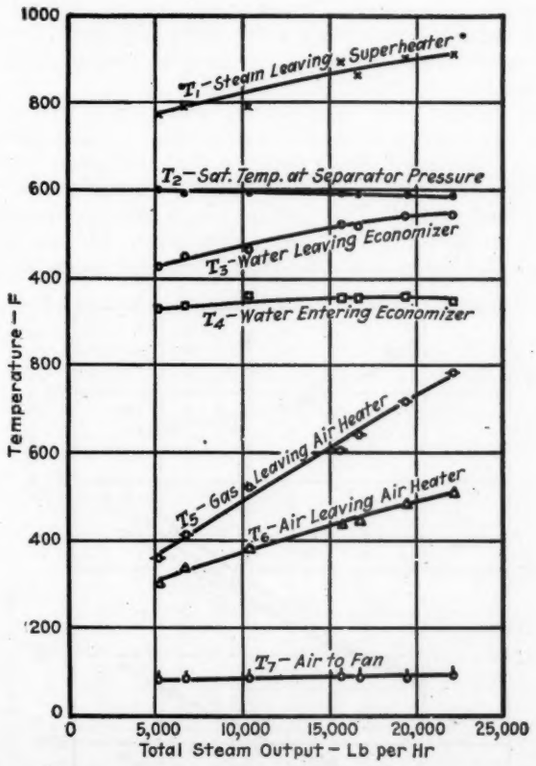


Fig. 9—Performance data showing variation of air, gas, steam and water temperatures at various locations in the boiler—Letters refer to temperature-measurement locations shown in Fig. 2.

for all the boiler auxiliaries would be an essential feature. These auxiliaries consist of a feedwater pump of the positive-displacement type, a blower for furnace combustion air, and a fuel pump of the positive-displacement type. Roughly speaking, the demands for combustion air and fuel oil are proportional to the steam output of the boiler, and in this particular type of boiler the feedwater demand is always in excess of the steam output of the boiler. The characteristics of the various auxiliary requirements are such that the relative speeds of all three auxiliaries should be high for high boiler steam outputs and low for low steam outputs. This makes possible the gearing of the three component parts in a fixed ratio and driving them by a single variable-speed steam turbine. Thus, the entire set runs at a speed determined by the steam output of the boiler with modification to the blower output by means of a damper, and to the fuel-oil output by means of a by-pass on the fuel-oil pump, with the feedwater-pump output as the independent variable from which the speed of the entire set is determined. The relative performances of the three component parts are determined as shown on the

composite curves Figs. 4 and 5. The boiler feed pump is designed to deliver the necessary full-load feedwater flow to the boiler at 100 per cent speed. At this same speed the combustion-air blower is designed to deliver, say, 10 per cent extra air so that it can be controlled by dampering. The fuel-oil pump is given a wide margin of extra capacity in order to take care of possible wear in its parts and also because its power requirements are relatively insignificant, and it is made a final variable dependent upon the air supply. The characteristic requirements of feedwater flow to the boiler due to the constant quantity of spillover water forces the auxiliary to run at somewhat higher speeds at less than full load than would be required by the combustion-air blower, as a consequence of which the combustion-air excess available is always greater at lower loads than at full load.

The particular auxiliary unit which was built for the developmental set is shown in various cross sections in Fig. 6.

The turbine runs at relatively high speed driving a pinion meshing with a high-speed gear on the blower shaft. This same shaft carries the low-speed pinion which meshes with a low-speed gear on the shaft of the boiler feed pump. The fuel-oil pump and the lubricating-oil pump for the set are driven from the outboard end of this same shaft through a pair of spiral gears.

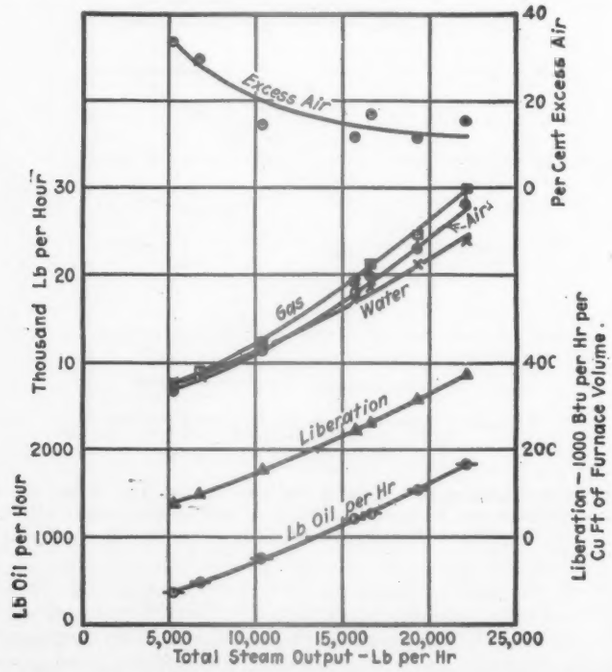


Fig. 10—Performance data from tests of the developmental Steamotive unit

The turbine for the developmental set is a relatively simple machine of only one stage.

The combustion-air blower is a centrifugal compressor having a maximum discharge head of about 60 in. of water. The boiler feed pump is a single-acting five-cylinder piston pump running at a normal full speed of about 800 r.p.m. with pressure lubrication of the crankshaft pins, connecting rods and crosshead wrist pins; relatively speaking, it is of small size and light weight for its capacity and high-pressure service. The pump inlet is supercharged to a pressure of about 75 lb. to avoid any possibility of cavitation due to the rapid motion of the pistons and the valves. The valves themselves are of hardened steel on hardened-steel seats of approximately 1 in. diameter and have a lift of from 0.03 to 0.05 in. With such small valves it is essential that no dirt particles of any size be allowed to enter the pump and a fine-mesh strainer is provided at the pump inlet. Fig. 3 shows the unit as it was finally assembled, illustrating relative proportions and compactness of the design.

Automatic Control

The automatic-control equipment is shown diagrammatically in Fig. 7.

In view of the limited amount of water and heat storage in Steamotive units and since all natural circulation is eliminated, it is of utmost importance in operating

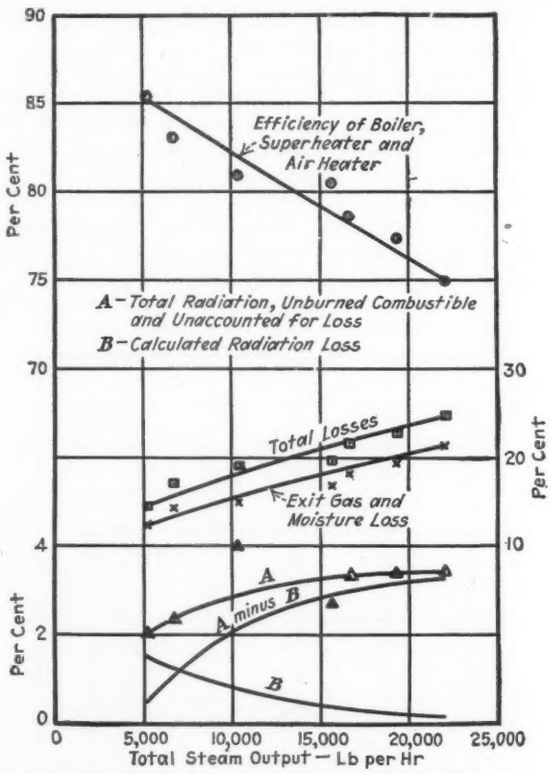


Fig. 11—Performance data from tests of the developmental Steamotive unit

this unit that water be fed as nearly as possible equal to the rate of steam output plus spillover. To accomplish this purpose the speed of the auxiliary set is governed to maintain any desired water flow from the feed pump.

The desired rate of water flow is established by measured indications of total boiler steam flow and separater-drum level, and the variable water-flow governor regulates the speed of the turbine driving the auxiliary set to maintain this water flow regardless of variations in steam or water pressure, feed-pump efficiency, or other variables.

One of the important principles upon which the Steamotive unit is designed is that of maintaining an excess of water leaving the evaporating furnace circuits. The quantity of this spillover water delivered into the separating drum is maintained constant at all outputs. The excess water flow is secured by means of a fixed-resistance tube connected to the bottom of the separating drum which will discharge the desired quantity of water with a given difference between drum and back pressures. A constant water level in the separating drum is maintained by the automatic control which adjusts feed-pump delivery, which is greater than steam output by the amount of spillover.

The fixed-resistance tube for normal spillover is in

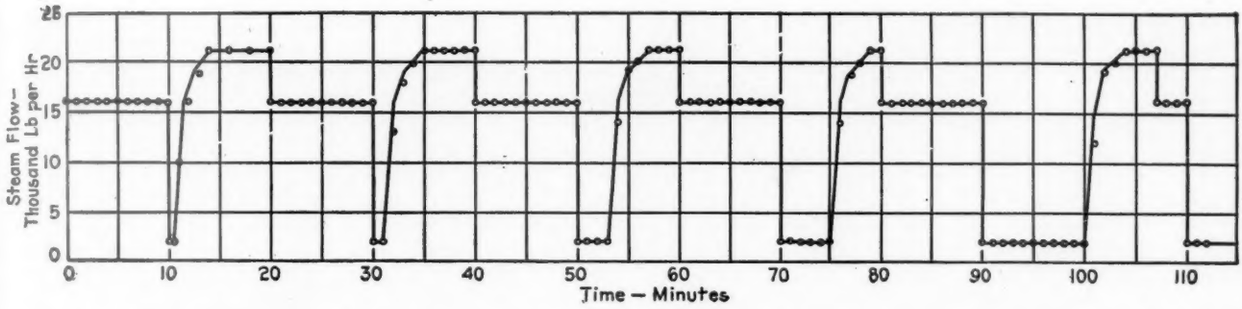


Fig. 12—Power-demand curves—The curve indicates the desired load cycle and the plotted points show the actual ratings reached by the boiler

parallel with the automatic spillover valve which opens when the water level exceeds the normal limit, quickly bringing the level back to normal by means of the large increase in spillover.

The auxiliary set is designed to provide an excess of air and oil at any given feed-pump speed and the automatic-control equipment is arranged so that necessary throttling of both is provided to maintain a constant steam pressure at the boiler outlet. In addition, the ratio of fuel and air is closely controlled in accordance with metered indications of each so as to maintain the minimum allowable excess air for good combustion.

The burner is provided with a propane torch with dual spark ignition and with a photoelectric flame indicator. A three-way valve is located in the oil line to the burner to shut off automatically the fuel-oil supply to the burner and recirculate the oil to the suction side of the oil

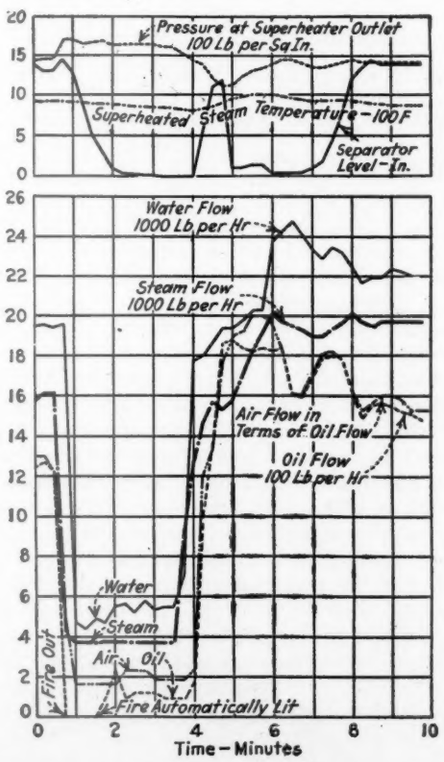


Fig. 13—Data from load-swing test of the Steamotive unit

pump. This three-way valve, the solenoid valve in the propane line to the torch, and the spark igniters for the torch are interlocked to perform the following functions: (1) Upon closure of the lighting switch, the igniters are energized and the propane valve opens, lighting the torch. After a short delay, the fuel-oil control valve is opened to the burner, and as soon as ignition of the oil fire is established, as indicated by the photoelectric flame detector, the propane torch and igniters are cut off after a short time delay. (2) The fuel oil is shut off in case of (a) high boiler pressure, (b) high superheat temperature, (c) high temperature at outlet of any furnace cir-

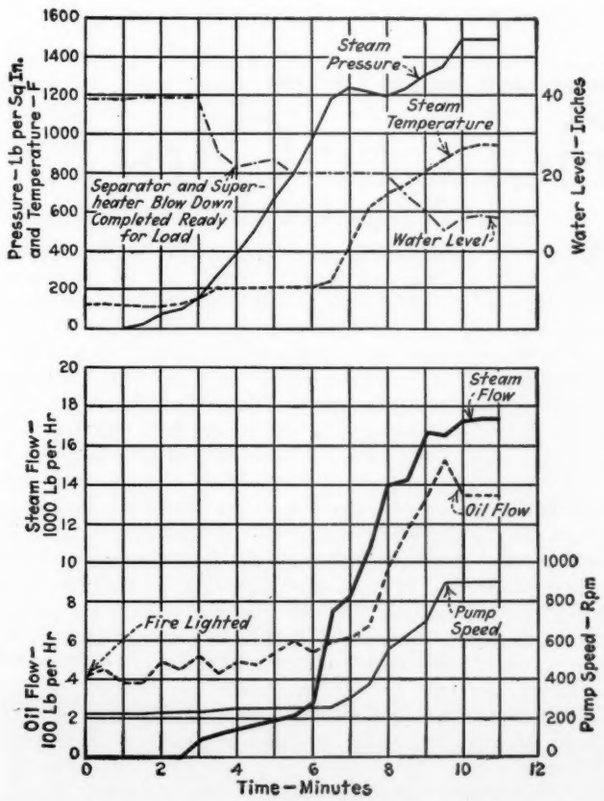


Fig. 14—Data from cold-starting test of the Steamotive unit. The unit had been shut down for 16 hrs. prior to lighting the fire for this test

cuit, or (d) flame failure. (3) The oil burner is automatically relighted when 2a, 2b, and 2c are restored to normal. (4) Upon loss of flame only, the relighting cycle is repeated several times, and if flame cannot be established, the unit is shut down, requiring manual reset. (5) Upon loss of feed-pump suction pressure or loss of lubrication-oil pressure for the auxiliary set, the oil fire and torch are cut off and the air supply to the governor of the auxiliary-set turbine is likewise cut off, shutting down the auxiliary set.

Test Results

Operating and heat-balance data obtained from final tests are given in Figs. 8, 9, 10, and 11. Before the tests

(*Continued on page 213*)

Seaboard covered hopper car for phosphate service

Seaboard Builds 70-Ton

Hopper Cars for Phosphate

Cars with average light weight of 50,800 lb. designed for shipping extremely fine material with minimum loss due to leakage as well as rapid unloading at destination

A 70-TON hopper car to meet the requirements of phosphate rock loadings at several mines on its southwest Florida lines was designed late in 1934 by the mechanical department of the Seaboard Air Line. Early in 1935 100 cars of this design, which has four hoppers and a roof with water-tight hatches, were built by the Pullman-Standard Car Manufacturing Company at its Birmingham, Ala., plant, and a year later an additional 100 cars of this design were received from the same plant.

The phosphate mining operation is largely hydraulic and, for many years, the washings from the larger or pebble phosphate were discarded. A flotation process of recovery for this very fine material was developed and it became necessary to have cars of a type and tightness to handle dry, in carload lots, this material which is approximately as fine as granulated sugar and has practically no bind or pack. Even the smallest openings, which would cause no loss with pebble phosphate, will cause the fine phosphate to leak and make cars unsuitable for service. Rapid gravity unloading through the bottom doors was also essential.

The following are some of the general features of these latest types of cars:

Length inside, ft. and in.	34— 9¾
Length over striking castings, ft. and in.	36— 6
Truck centers, ft. and in.	26— 6
Width inside, ft. and in.	10— 2
Height at eaves, ft. and in.	9—11⅞
Height over running board, ft. and in.	10— 9¾
Capacity level full at eaves, cu. ft.	1,912
Average light weight, lb.	50,800

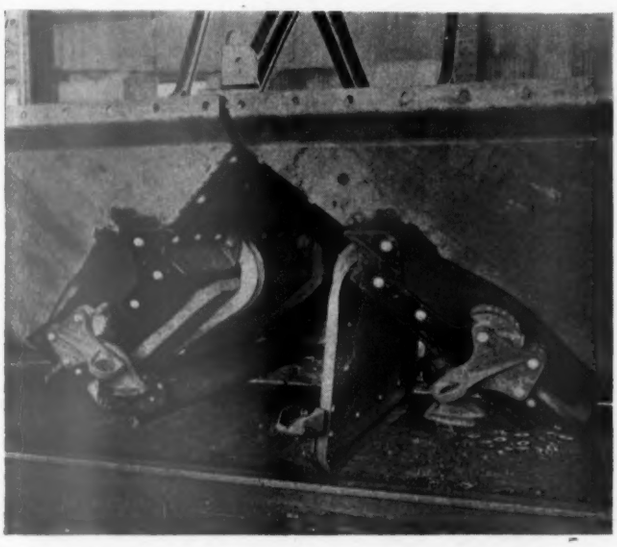
The body of these cars is of as simple structural design as possible to meet the requirements. Consideration was given to the accuracy with which they could be built, and the ease with which they could be repaired. The floors and cross ridge sheets have slope angles of 40 deg. The hopper construction is such that there are no valleys where this angle of slope is reduced, or where the material is required to change the direction of flow in discharging. The interior bracing is of cast-steel truss formation, thus permitting of longitudinal or cross flow through this bracing to equalize loading or unloading movement of the material. The fit of the doors on the door frames is such that a very tight closure is assured, and will be maintained over a long period by the manner in which this fit is accomplished. Rapid loading and unloading, tightness of doors against loss of lading, and water tightness of the roof and car sides were the primary requirements of the body design.

The body material was largely open-hearth plates and rolled shapes. The center sills are 12-in. 30.9-lb. ship channels with $\frac{7}{16}$-in. by 13-in. continuous cover plate, and riveted and welded reinforcements along the lower flange, so that the eccentricity of the draft center line to neutral axis of sills is practically zero. This type of construction was used to afford the widest door openings and least obstruction to flow in unloading. The side sills, end sills, top side plates, corner and end posts, and

Roof construction of the Seaboard 70-ton hopper car

stakes are all rolled sections. The car sides are 3/16-in. open hearth steel; the floors, outside and inside hopper sheets and cross-ridge sheets are 1/4-in. open-hearth steel. The longitudinal hood is 3/16 in. Cor-Ten steel. The interior bracing is Unitcast steel crossbearer arms and framing between the side sills, stakes and center sills at three places. The hopper door construction is Wine hopper frames with 3/16-in. Cor-Ten steel doors secured with Wine door locks. The body bolster construction is Unitcast W-type one-piece cast-steel bolsters.

The roofs of these cars are 1/8-in. Cor-Ten steel. All seams are riveted with tarred felt between sheets. The roofs are fitted with eight roof hatches. The hatch openings are reinforced with a channel frame. The roof doors, or hatch covers, are 1/8-in. Cor-Ten steel hinged transversely so that they will lie approximately flat on the roof when open and give maximum clearance for loading under the storage bins. The hatch covers are secured by a sliding bolt type of lock. The running boards are wood and fitted with shields at the hatch



The hoppers are equipped with Wine door frames and pressed Cor-Ten doors

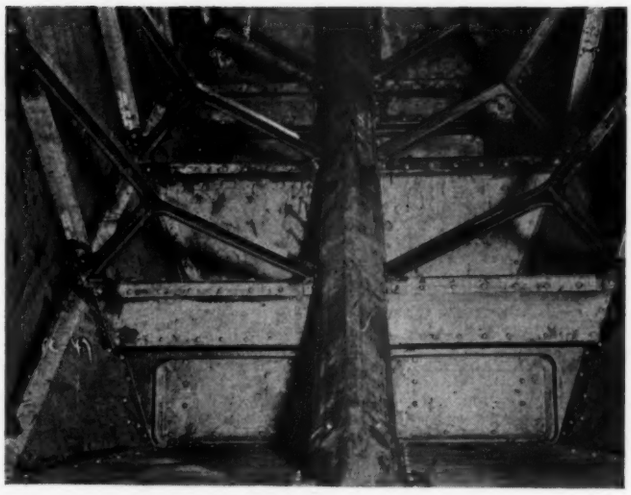
openings to prevent materials in the loading of cars from lodging under these running boards. The roofs must test for water tightness with spray or hose test.

The truck side frames are the American Steel Foundries Vulcan type for 6-in. by 11-in. journals. This type of truck was selected on account of the limited facilities at the mines for changing wheels if found necessary. The journal boxes are Symington malleable iron for Vulcan trucks. The wheels are 850-lb. chilled-iron single-plate, A.A.R. Standard. The springs are A.A.R. with one Cardwell friction unit Type A at each spring group. Truck bolsters are cast steel. Truck brake rigging, beams, brake shoes, hangers and other parts conform to A.A.R. or railroad specification.

Several types of draft gears were used in these cars, the division being between Cardwell, Cardwell-Westinghouse, Waugh, and National. Couplers are A.A.R. Type E, 6¼-in. by 8 in. shank, bottom operated. Yokes are A.A.R. vertical cast steel.

The air brakes are Westinghouse Type AB, and hand brakes are divided between Universal and Ajax. Metal brake steps of the T-Z design are used.

No attempt was made to lighten the design of the car at the sacrifice of useful material, or by using any details not entirely suitable for the service requirements. The satisfactory light weight was accomplished by careful



Interior of the car showing the bracing

consideration of the different elements wherein weight might be saved with no loss of safety or service value. The car, with its roof, has a ratio of pay load to gross load of 75.8 per cent.

Automatic Heating System For Refrigerator Cars

A closed heating system has been designed by the Safety Car Heating & Lighting Company for application to refrigerator cars with ice bunkers and Silica Gel iceless refrigerator cars. The heating system circulates diethylene glycol and is operated automatically through thermostatic control of a heating element which burns liquefied propane gas. In well-insulated cars the thermostatic control regulates the system to maintain set inside car temperatures with maximum fluctuations of about 3 deg. F. above and below the set temperature. Tests have shown that temperatures within the car remain within this limit of 3 deg. F. and that the maximum variation in temperature between the top and bottom of the car does not exceed 3 deg. F. The results of a test run between Summer, Wash., and Jersey City, N. J.,

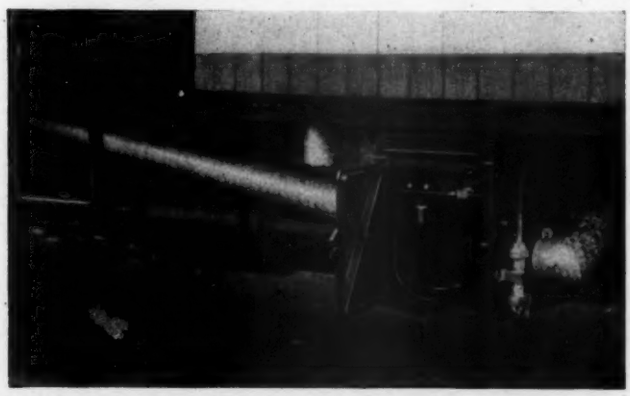


Fig. 2—Safety heating system installed on a Merchants Despatch refrigerator car

during which the outside temperature varied from 12 deg. F. below zero to 62 deg. F. above zero, showed that the heating system kept the average inside temperature at 36 deg. F., and that the maximum variation in temperature between the top and the bottom of the car

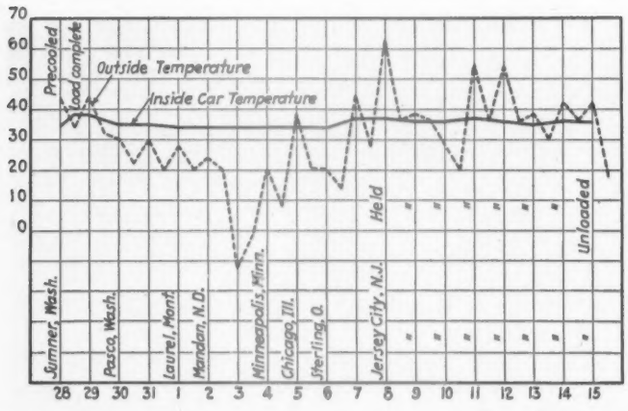


Fig. 1—Record of inside and outside car temperatures of a shipment of hot-house rhubarb moving under heater service from Sumner, Wash., to Jersey City, N. J. The thermostat setting was 36 deg. F., and the average temperature maintained was 36 deg. F.

was 3 deg. F. The results of this test are plotted graphically in Fig. 1.

A box containing the heater and its controls is placed outside the car beneath the floor, and the heated diethylene glycol passes from the heater to pipes placed on the car floor under the floor racks. A thermostat bulb placed inside the car operates the controls of the heating element and keeps the burner in operation the proper length of time to maintain the desired temperature. It has been found that well insulated cars can be preheated in less than 24 hr. to a temperature of 40 deg. F. when the outside temperature is 40 deg. F. below zero. The liquefied propane gas is stored beneath the car floor in a tank which in most installations has a capacity of 300 lb.

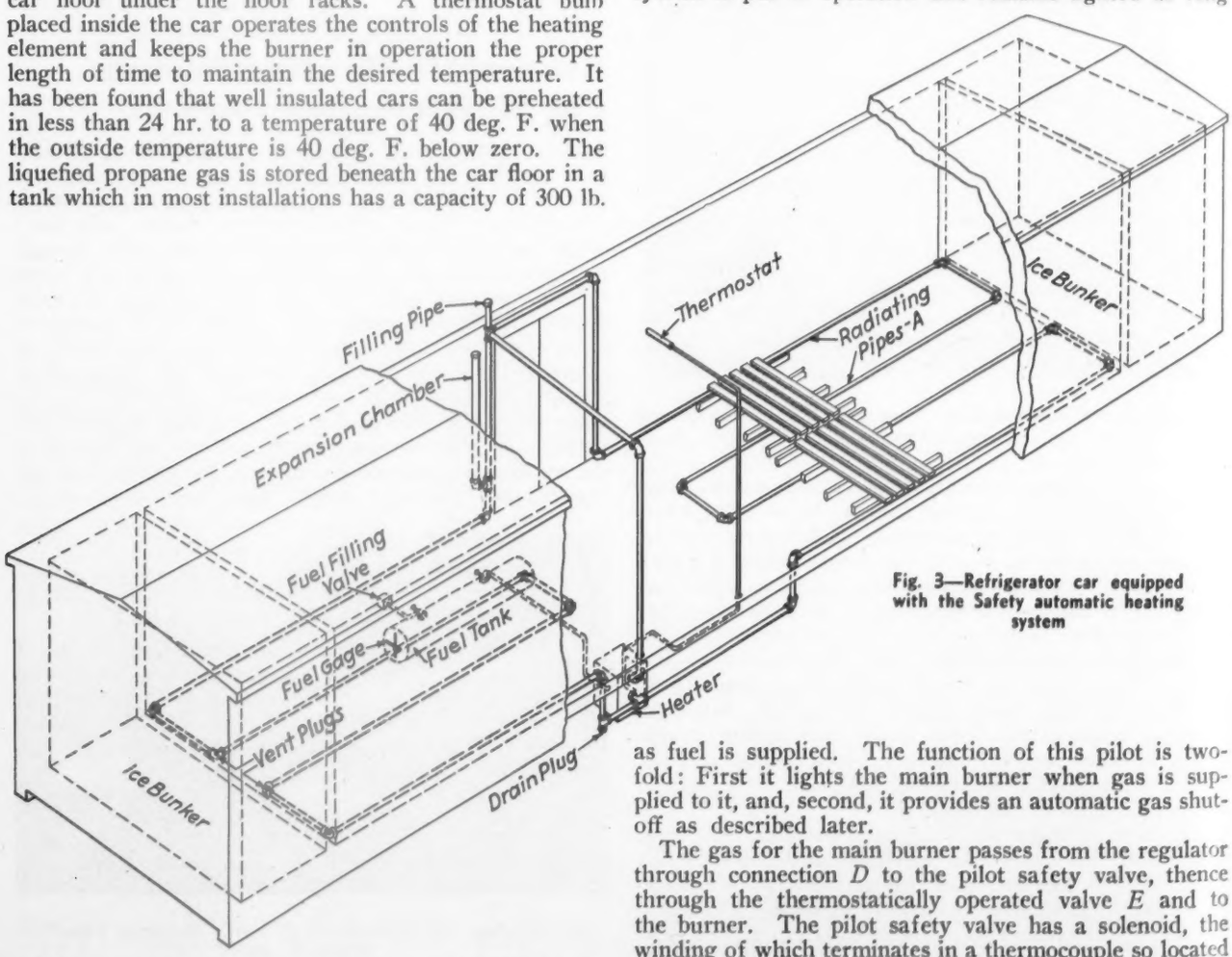


Fig. 3—Refrigerator car equipped with the Safety automatic heating system

Diagrams of the system, heating element and controls, and an illustration of an application of the heating element to a Merchants Despatch refrigerator car are shown in the various illustrations. A detailed description of the heating system follows:

The heat is applied to the car by means of radiation from pipe coils *A* located on the floor under the floor racks shown in Fig. 3. The ends of these coils connect, as shown in Fig. 4, to a heating element *B* in the heater assembly forming a closed system which is filled with a solution of diethylene glycol. As heat is applied to the heater element, heating of the solution causes it to circulate in the same manner as in the usual hot-water heating system. The solution lasts indefinitely and new solution is required only to replace any loss due to leakage.

Propane, a liquefied petroleum gas, is used to furnish the heat and is carried in a tank suspended under the car body. This tank has a gage, which indicates the amount of fuel in the tank, and necessary filling and shut-off valves.

Vaporized propane is taken from the top of the tank and piped to the heater at *C* where it enters the liquid trap. This trap serves to retain liquid propane which may find its way to that point and prevent it from entering the pressure regulator. The vapor up to this point is under pressure corresponding to the atmospheric temperature. The pressure regulator reduces this pressure to 13 in. of water and holds it constant at that value for supplying the burner.

A small amount of the low-pressure vapor is fed directly to a small pilot burner which is lighted when the system is put in operation and remains lighted as long as fuel is supplied. The function of this pilot is twofold: First it lights the main burner when gas is supplied to it, and, second, it provides an automatic gas shut-off as described later.

The gas for the main burner passes from the regulator through connection *D* to the pilot safety valve, thence through the thermostatically operated valve *E* and to the burner. The pilot safety valve has a solenoid, the winding of which terminates in a thermocouple so located at *F* as to be heated by the pilot flame. The thermo-electric current thus generated energizes the solenoid, which acts on an armature attached to the valve, to hold the valve in an open position. If the pilot be extinguished from any cause, the cooling of the thermocouple will de-energize the solenoid and permit a light spring to close

the valve, thus shutting off the supply of gas to the main burner. The pilot valve must be manually reset after relighting the pilot by removing cap *G* and lifting pin which opens the valve and brings the armature in contact with the solenoid core.

The supply of gas to the burner is controlled by the thermostatic valve *E* which is composed of a snap-action valve actuated by the expansion and contraction of a metal bellows connected by means of a small-bore tube

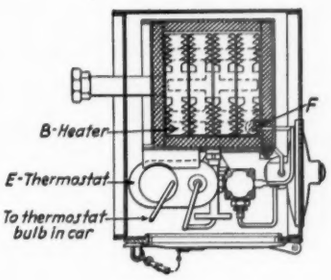
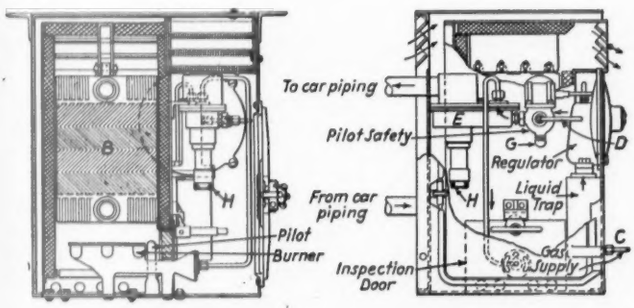


Fig. 4—Heater and controls for Safety automatic heating system



to a bulb located within the car body and filled with a temperature-responsive vapor. As the car temperature rises or falls the change in pressure within the bellows operates to close or open the valve as required to maintain a constant temperature in the car. The knurled cap *H* moves over a scale divided in degrees *F* and, to adjust the system for any desired car temperature, it is only necessary to turn *H* to the desired temperature on its scale.

The heating element consists of an assembly of cast sections similar to the usual hot-water radiator, and has ribbed external surfaces for increased heat transfer. These are enclosed in an insulated casing with openings at the bottom to admit necessary air for combustion and at the top for escape of the products of combustion.

The fuel supply may be carried in a tank permanently attached to the car and refilled from storage tanks established at convenient points, or the car may be equipped with suitable racks for receiving the standard flasks in which propane is shipped, the procedure in this case being to remove flasks as they become empty and replace with full ones.

Turbo-Electric Locomotive

(*Continued from page 209*)

were begun there was some apprehension about being able to reach the desired capacity of 21,000 lb. of steam per hr. with any reasonable combustion efficiency. Although the design capacity for continuous running was for 16,000 lb. of steam per hr., the unit ran 40 continuous hours at 21,000 lb. per hr. and was tested up to 22,000 lb. per hr., which was the limit of the blower for continuous operation.

At the normal load rate of 16,000 lb. of steam per hr. the feedwater pressure entering the economizer is 1,610 lb. and the steam pressure at the superheater outlet is 1,390 lb. there being a 220-lb. pressure drop through the economizer, boiler, and superheater. The steam temperature leaving the superheater at an output of 16,000 lb. per hr. is 870 deg. F., rising to 910 F. at 22,000 lb. per hr. and dropping to 770 deg. F. at 5,000 lb. per hr.

The air pressure entering the air heater is 18 in. of water at a steaming rate of 16,000 lb. per hr., which increases to 43 in. at a rate of 22,000 lb. per hr. The air entering the burner is 45 deg. F. at a rate of 16,000 lb. per hr. and 500 deg. F. at a rate of 22,000 lb. per hr. Combustion is complete within this range of output with less than 15 per cent excess air, and combustion rates from 25,000 to 375,000 B.t.u. per cu. ft. of furnace volume per hr.

The boiler efficiency varies from 75 per cent based on the high heat value at a rate of 22,000 lb. per hr. up to 85.5 per cent at a rate of 5,000 per hr. These efficiencies are 4 to 5 per cent higher than those originally anticipated from the limited heating surface permitted under the conditions to be met in locomotive design.

Fig. 12 shows the type of load-cycle tests which were made on the unit to determine its suitability for performance on a high-speed locomotive. The solid curve indicates the desired load cycle and the plotted points show the actual ratings reached by the boiler at each particular time.

The load-cycle tests on the unit were in two periods of 80 and 267 hr. duration. Approximately 450 cycles from minimum to maximum load were made. The total operating time of the unit at Schenectady was 950 hr.

Fig. 13 shows results of a typical test made to determine the flexibility of this unit. This simulates a station stop of a locomotive, when the steam flow, except for driving the auxiliary set, is quickly shut off. The unit continues at a low load for 3 min. when the throttle is opened, increasing the steam flow to approximately 16,000 lb. per hr. in 1 min. and to 20,000 lb. per hr. in 2½ min. The effect of these load changes upon steam pressure, steam temperature, water level in the separating drum, water flow, air flow, and oil flow are clearly shown.

During these load-cycle tests, such as shown in Fig. 11, oil was burned at rates well above the maximum output rate for short periods during the load pickup, and during some of these periods the liberation was as high as 500,000 B.t.u. per cu. ft. of furnace volume per hr. with low excess air, complete combustion, and freedom from smoke.

Fig. 14 shows how quickly the boiler may be placed in service from a completely cold condition, except that the auxiliary set was driven from an external source. Note that the boiler is steaming at reduced pressure within 4 min. and has picked up to full load with normal pressure and temperature after 6 min. more.

WINE TRAINS.—Instead of snow trains or bicycle trains as we operate them over here, the French railways operate wine trains from Paris to the various wine growing centers, so that the connoisseurs may sample the delights of the vintage of the grape at the famous places where it is grown and pressed.

THE PAY GETS THROUGH.—During the recent flood, the general office building of the Louisville & Nashville was partly under water, but the employees got their pay just the same. Hiring a boat, the paymaster rode down the flooded streets and into the building, and, pulling on his oars, rowed up to the vault, opened it, and rowed inside to get the money with which to meet the payroll.

Axles and Bearings Tested in

Timken Research Laboratory

Equipment installed by Timken Roller Bearing Company used for fatigue testing of full-size locomotive axles and bearings. Torque device records power loss in bearings

LATE in 1936 the Timken Roller Bearing Company, Canton, Ohio, installed in its research and testing laboratory a testing machine capable of determining the fatigue strength of full-size locomotive-axle assemblies 8 ft. long and up to 14 in. in diameter. This machine, designed by Timken engineers as a means for obtaining basic data on full-size axles operating at high speeds and equipped with Timken roller bearings, can be used for testing two axles simultaneously, one axle being mounted on each end of the machine as shown in one of the illustrations. A cantilever loading system is used, the load being applied by springs capable of 80,000 lb. load. Standard Timken locomotive driving-wheel journal boxes are used on the load end of the shaft, while the wheel end is mounted in a central shaft. This shaft is equipped with Timken rolling-mill type bearings. The main shaft is driven through an eight-strand V-belt by a 100-hp. variable-speed motor, the main shaft being designed to run at a maximum speed of 1,100 r.p.m.

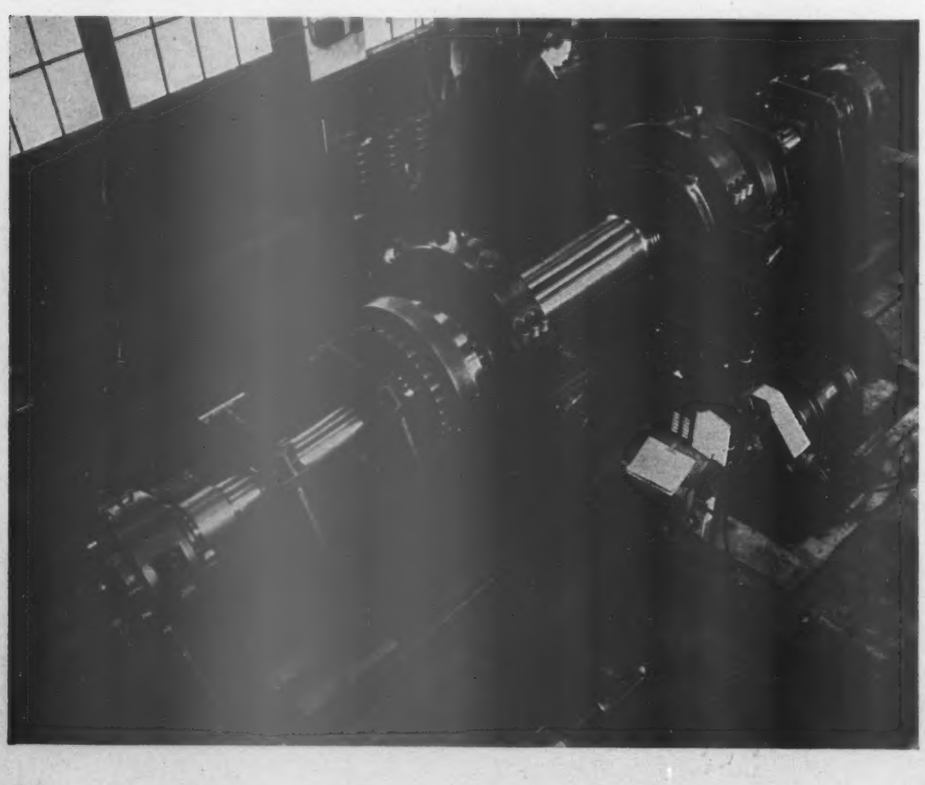
Axle fatigue failure develops within the wheel fit just inside the inner wheel-hub face. The general nature and the location of the axle failure produced by the Timken axle testing machine is comparable to that produced under actual service conditions.

The axle testing machine is one of the additional pieces of equipment recently installed in the new laboratory. A large and complete set-up for photoelastic research and testing also has been installed. Much valuable data as to stresses and their distribution in various design members such as fillets, notches and other design shapes for which there is no analytical solution for the calculation of stresses have already been secured on this equipment. A typical fringe pattern showing the lower stress concentration in an axle due to the relief groove in the hub pressed on the axle is shown in one of the illustrations.

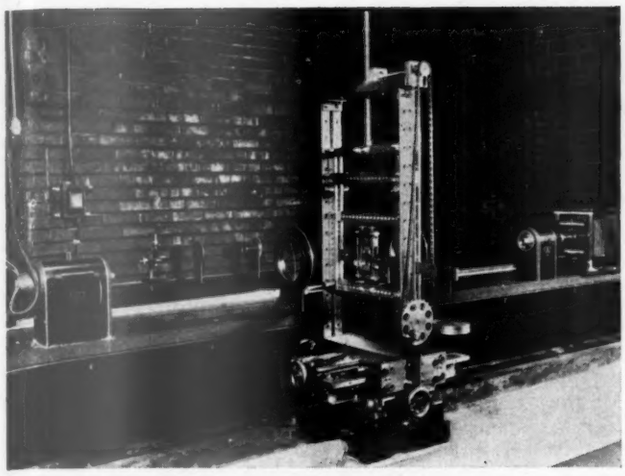
Office, darkroom and drafting facilities as well as sufficient machine-tool equipment are provided in the laboratory, which is operated in a 24-hr. basis, most tests being continued to destruction. Chemical and metallurgical facilities are available in the Steel and Tube Division laboratories of this company, which are used to supplement and amplify the work done in the physical testing laboratory. Much of the machine work in preparing specimens is done in the bearing-plant tool room or experimental department, thus saving laboratory time and floor space.

One end of the building is occupied by a battery of eight machines designed to test bearings up to 8 in. outside diameter to destruction under radial and thrust load. These machines consist of test spindles on which are mounted four bearings. Two spindles are connected by a coupling and driven through spiral gears from a motor shaft, each shaft driving up to four sets of spindles. By changing the spiral driving gears a wide range of speed may be secured.

Bearings are loaded in these machines by a hydraulic



Machine for making fatigue tests on full-size locomotive axles up to 14 in. diameter

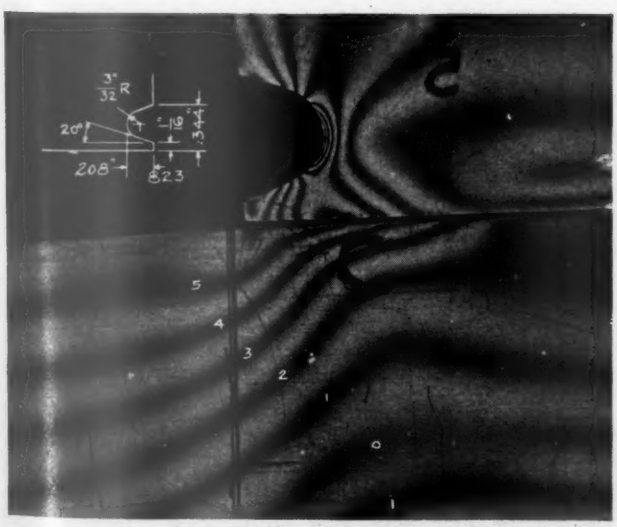


Photoelastic records of stress distribution are made on this equipment

pressure system, oil being supplied at 1,800 lb. per. sq. in. to the control system and each spindle being equipped with an adjustable relief valve. Through these valves the oil is fed to cylinders, one being located below each spindle. The cylinders and the pistons both float, transmitting the load through bell cranks on a fixed mounting to a yoke connected to the center bearings on the spindle. The load is then transmitted to the bearings at each end of the spindle. By this arrangement all bearings receive the same load. Thrust load is applied through a lever system compensated by knife-edge levers to obtain concentric loads. In the case of small bearings the thrust load is applied by dead weighted levers, while on the larger bearings it is applied by hydraulic pressure.

Testing Machine for 24-in. Bearings

One of the most recent installations in this laboratory is a bearing testing machine which is thought to be the largest in the world. This was designed by Timken en-



Typical example of fringe pattern showing stress concentration in an axle

gineers to meet their special needs. In it single- or double-row bearings up to 24 in. outside diameter can be tested for fatigue under both radial and thrust load. Radial loads up to 500,000 lb. and thrust loads up to 200,000 lb. may be applied to the bearings under test by means of hydraulic rams. A torque device, installed between the transmission and the test spindle, indicates the power loss in driving the bearings.

Supplementing the 24-in. radial thrust machine is a 12-in. unit which has a capacity of 150,000 lb. radial and thrust load. This unit measures torque through a cradle on which both the driving motor and transmission are mounted. The lubricant is circulated through a cooling system beneath the machine.

Two profilographs are installed in an air-conditioned room. The unit shown in one illustration is capable of 5,000 times vertical magnification, while the other is used for amplications up to 2,000 times. This equipment was originally developed for the Timken company in the research laboratories of the University of Michigan and is used for checking surface finish. A beam of light from a 108-watt projection lamp passes through a slit and lens to a small mirror mounted at an angle on one end of a bell-crank lever, the other end of the lever carrying a diamond point which rests on the specimen. This specimen is mounted on a platform having rectilinear motion, this platform being connected through gearing to the recording drum. From the small mirror the beam of light is reflected to a series of three other mirrors to increase the length of the light path, the beam being finally collected in a cylindrical lens and focused to a pin point on a sheet of sensitized paper mounted on the drum shown at the back of the panel.

To check the quietness of bearings, a machine was developed which allows a bearing to be loaded with any pressure desired up to 1,000 lb. and run in a soundproofed room for testing. The machine is capable of running at constant speeds or being accelerated or decelerated as desired.

Pullman Remodels Sleeping-Car Facilities

Three new and radically different accommodations, all of the private room character, recently announced by the Pullman Company, will be found in the equipment now being built for the North Western-Union Pacific-Southern Pacific Streamliners "City of San Francisco" and "City of Los Angeles," the Santa Fe's "Chief," the New York Central's "Twentieth Century Limited" and the Pennsylvania's "Broadway Limited."

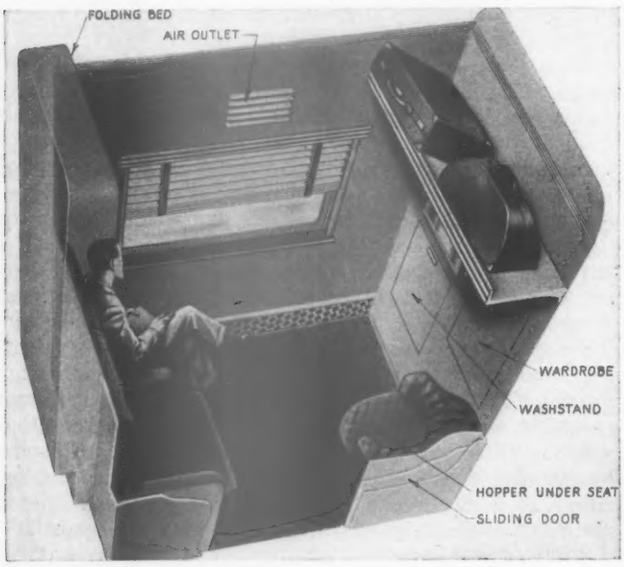
Two of these accommodations will bear the drawing room and compartment designation familiar to Pullman patrons, but important changes in arrangement have been devised for the new-type rooms. The third accommodation, called the roomette, is new from top to bottom, including the name.

The "Roomette"

The roomette is a small, completely enclosed, private room within the space of a section, containing one bed. Eighteen roomettes can be placed in one Pullman car. In daytime the bed folds into the wall at one end of the room, and the passenger has a sofa seat of the latest and most comfortable contour, with ample space for lounging, or for undressing before the bed is lowered for the night-time arrangement. For dressing the passenger can make the whole room space and its complete toilet facilities available by returning the bed to its niche in the wall. The slightest effort will accomplish this, and a safety ratchet eliminates any danger of the bed falling during the operation. When the bed is made down for the night it is fastened at the foot by an automatic lock. This is easily released when the passenger desires to

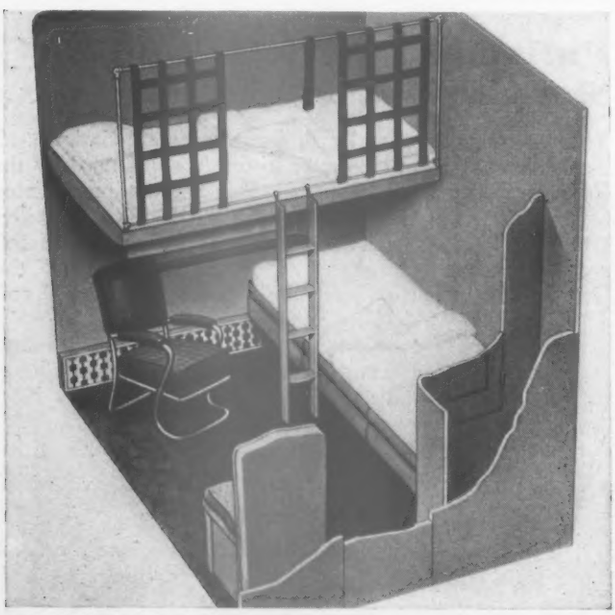
raise the bed, and the lock then reverses and holds the bedding in place. The bed is 6 ft. 5 in. in length.

The door of the roomette can be locked at night, or left open and a curtain drawn across the opening. The patron has many conveniences, such as individual regu-



The arrangement of facilities in the Pullman roomette

lation of ventilation, heat and light; complete toilet facilities, with washstand folding into one wall, and above it a mirrored cabinet for toilet articles, with tubular lights on each side; a locker in which to hang clothes; a large



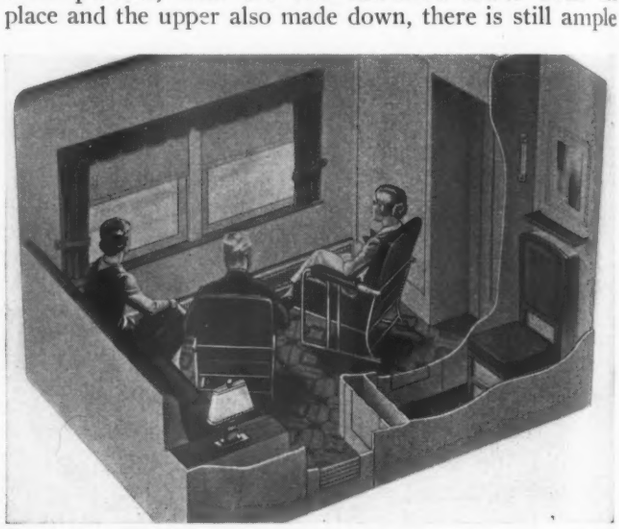
Spaciousness results from the new interior arrangement of the compartment

rack for luggage; a vacuum water bottle in a niche at the bed head, and a box from which the porter can remove shoes without disturbing the sleeper. Ceiling and reading lights of new design provide ample illumination. One daytime novelty is an adjustable footrest that can be pushed aside when not desired.

As the roomette is completely air-conditioned the passenger can enjoy his pipe, cigar or cigarette, knowing that the smoke will be withdrawn almost immediately through a grilled outlet, and without discomfort to those in adjacent roomettes.

The New Drawing Room

Spaciousness is the impression received by travelers entering the new drawing room in the daytime. The enlargement has been attained by rearrangement of facilities, such as absorbing into the room the space previously occupied by the toilet annex and the entrance lobby, and then building a very compact annex in an aisle corner of the room itself. A bed folding into one end wall has been substituted for the old fixed couch; the section seats by the windows have been removed, with substitution of a long transverse sofa, convertible into an equally long bed (with an upper berth) along one wall of the room. The folding bed when ready for night service is at right angles to the others, along the window wall. All three beds are 6 ft. 5 in. in length and of standard berth width. When the room is prepared for three persons, with the two full-sized lower beds in place and the upper also made down, there is still ample



The rearranged drawing room is a spacious living room by day

dressing space, also easy, unobstructed access to the annex, to the clothes closet and to the doors to the passage way and adjacent room.

For day travel the wall bed disappears, the upper is put away and the third bed becomes a sofa. This leaves ample space for the two comfortable, movable lounge chairs, giving a real living room effect. The chairs are of folding type, and at night are placed under the wall bed.

The drawing room not only has an electric fan but is provided with individual regulation of lighting and ventilation, and thermostatic control of the heating, which can be regulated however to suit individual tastes. Then there is a wardrobe in which to hang clothes; storage space above the annex for luggage, with additional pieces going under the sofa, and a shoebox opening on the passage way. The lighting consists of an especially designed ceiling fixture, a reading lamp on a table at one end of the sofa, and other illumination where needed.

The New Compartment

The new compartment is another example of obtaining additional space comfort through rearrangement. Gone are the section seats by the windows, replaced (as in the drawing room) by a transverse sofa occupying nearly the entire width of the room. The upper berth remains above the window, and is at right angles to the convertible sofa-bed. There is space between the sofa

and the opposite wall for a comfortable lounge chair. At night the chair is placed out of the way, under the upper berth; but even then it is available for lounging and reading. Occupants are therefore provided during the day with a comfortable sofa on which they may sit or recline, and also an easy chair. As in the drawing room, both beds are 6 ft. 5 in. in length and of standard berth width.

The compartment also has an electric fan, individual regulation of lighting and ventilation, and thermostatic heat control. Each compartment is provided with complete toilet facilities, a wardrobe for cloths, a shoebox, and the latest designs in lighting fixtures.

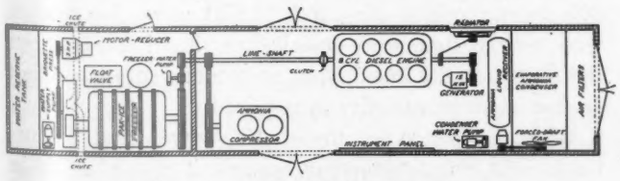
Diesel Engine Powers Mobile Ice Plant

Declared to be the first of its kind in the world, a self-contained, mobile refrigeration plant all housed in a standard freight car is now in service. The ice making equipment was made and installed by the Vilter Manufacturing Company, Milwaukee, Wis., and consists of a Pak-Ice briquette machine, ammonia compressor, evaporative condenser, liquid receiver, generator, pumps and fuel and water tanks. The power is furnished by a 160-hp. eight-cylinder V-type Caterpillar Diesel engine. A diagram of a complete installation is shown in the drawing.

Although this outfit has been in service for only a short time, it has been found to have many advantages, two of which are economical operation and instantaneous production. It attains full capacity production in 20 min. With an average price for Diesel fuel of 6 cents per gal. and an average consumption of 4.9 gal. per ton of ice produced in this mobile plant, the cost per ton of ice is 31.5 cents.

This track ice unit was designed especially for icing refrigerator cars. It is entirely independent of outside power and resources, with the exception of water, and this feature permits its operation when and where desired. It has been pointed out that some agricultural communities require ice for only one or two months out of the year, making a permanent ice plant impractical. Formerly, ice had to be brought in from distant points at prices as high as $8.00 per ton. Including power, labor, water and depreciation, the new mobile unit can produce ice in these communities at a small fraction of this figure.

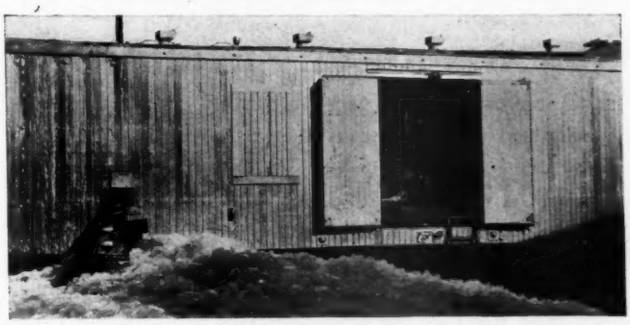
Briquettes can be turned out from this unit in any of four sizes, ranging from 2 oz. to 1.6 lb. each. Automatically ejected from the press, they are spouted out of the car through small openings in the side wall as shown in one of the illustrations. From there they may be spouted, conveyed or shoveled into storage bins or



Floor plan for Mobile Pak-Ice unit

directly to the point of use. Both briquettes and ice in a snow or crystal form for layer icing of fruit and vegetables may be produced by the unit. The briquettes can be used for car icing or space cooling as their rounded shape provides for free circulation of air.

The Caterpillar Diesel engine operates at 850 r.p.m. The engine exhaust passes through a water heater and then to a Maxim silencer or muffler mounted on the roof. Fuel oil is carried in two tanks of 435 gal. capacity fastened underneath the floor of the car, this capacity being sufficient for 80 hrs. of operation. A twin-cylinder gasoline engine of the horizontal opposed-piston type is mounted at the rear of the Diesel and is used as a start-



Ice briquettes discharged from chute and piled outside of the car

ing engine. The Diesel crankshaft extends beyond the engine block on both ends. One end of the shaft drives a 15-kw. d.c. generator by means of a V-belt connection. Thus, all electric power needed for lighting, for pump, fan and other auxiliary motors, and for the automatic control and safety devices, is supplied by the unit itself. The other end of the shaft is connected by means of a frictional clutch to an 8-ft. line shaft running slightly above floor level. This drives the ammonia compressor and the Pak-Ice freezer. A Vilter 8½-in. by 9½-in. single-acting, vertical twin-cylinder ammonia compressor is V-belt driven from the line shaft. The freezer, also driven from this line shaft, has a capacity of 30 tons.

At the back end of the car there is a reserve water

Mobile Vilter Pak-Ice unit of 30 tons capacity installed in a standard car

tank with a capacity sufficient for 1-hr. operation. The tank is equipped with an automatic switch operating an alarm bell whenever the water level becomes low. At the front end of the car is an intake opening for 16 air filters of 13,000 c.f.m. capacity at a velocity of 300 ft. per min. These filters provide air for the condenser.

Next to the Diesel engine is an opening in the wall for the radiator of the engine-cooling system. The fan is V-belt driven from the crankshaft by a quarter turn pulley arrangement. Both the Diesel cooling and lubrication systems have an alarm feature in case of supply failure. A gage panel on the wall opposite the Diesel contains the suction and discharge pressure gages for the compressor, fuel oil gage, and the various generator and automatic control switches and instruments. The Diesel engine which drives this plant is of typical "Caterpillar" design. Features of the engine are individual fuel pumps for each cylinder, solid injection, positive starting by means of a small two-cylinder gasoline starting engine, full protection by use of fuel, lubricating oil and air filtering system, and a precision-built fuel system.

EDITORIALS

The Atlantic City Exhibit

It is almost seven years since the last big railway mechanical exhibit was held at Atlantic City. During these years, in spite of the depression period, a great number of improvements have been made in the design of locomotive and car parts, in maintenance and repair facilities, and in the development of new equipment designs. The manufacturers and railway supply interests have not had the same facilities for bringing these improvements to the attention of the railroaders far and wide, as was true in the pre-depression days. Meanwhile, there has been a great change in the mechanical department supervisory forces. Many of the older supervisors have retired and the younger men who have been promoted have had little or no opportunity of seeing the new devices and improved facilities demonstrated.

It was for these reasons that the members of the General Committee of the Mechanical Division and the officers and executive committee of the Railway Supply Manufacturers' Association, rather enthusiastically agreed some months ago that it would be wise and in the best interests of all concerned to hold the convention at Atlantic City this year, and to parallel it with an exhibition, which promises far to surpass anything that has yet been held. In discussing the matter it was quite clearly brought out that the railroads could benefit greatly by having as many of their supervisors as possible attend the convention and carefully study the exhibits. In effect, it will be a small university and should be taken advantage of in that spirit.

Moreover, because of the large interest which the public has shown in railroad improvements in recent years, it was felt advisable to set aside the Saturday and Sunday between the conventions, so that the exhibits could be thrown open to the general public. Undoubtedly special trains will be run from the larger cities in the East, so that those who desire may spend the week-end in visiting the exhibition in the Auditorium and the track exhibit located near the railroad station. The Purchases and Stores Division, A.A.R., will hold its three-day convention on June 21-23. In addition, the Association of Railway Electrical Engineers will hold a one-day meeting on Thursday, June 17. The Air Brake Association is also arranging for a two-day meeting at the Haddon Hall on Thursday and Friday, June 17-18.

To insure the best results from the exhibit two things are important. First, that the groups from each railroad organize in such a way as to cover the exhibit thoroughly, and, second, that the exhibitors make every reasonable effort to make their displays as educational, in a practical way, as possible. The exhibit will entail a tremendous amount of expense, but if it is properly used, it will enable the exhibitors to bring their devices and equipment to the attention of railway officers and supervisors with a minimum of expense per railway supervisor as compared to other methods of approach. Since, in the last analysis, the railways will have to pay for the exhibit, even though the out-of-pocket expense comes from the exhibitors, it is important that every reasonable effort be made to capitalize upon the opportunities which are offered.

Clearing the Decks For Action

Throughout the depression the railroads of the United States were quietly going about a job of preparing for the future which is of unusual significance at the present time. Those who have lived with the railroad problem for many years saw the curtailment of operations result in the storing of thousands of cars and locomotives until, at the bottom of the depression, it looked as if most of the equipment were laid up on side tracks.

The designers of equipment did not, however, place their ideas in storage. The depression years saw the introduction of new forms of equipment which have resulted in attracting new freight and passenger business and made it possible to operate with greater economy. It was to be hoped, and now seems to be an actual fact, that a very large part of the obsolete equipment that the depression forced out of service will not now ever be returned to service but will be replaced, in the coming years, with modern, efficient equipment. In fact, during the seven years 1930-1936, inclusive, 514,000 more freight cars and 12,000 more locomotives were retired than were installed, a situation which sets the stage for the installation of modern equipment just as fast as more capacity is required.

What happened in the motive-power and rolling-stock field was spectacular because it was plain to be seen by everyone connected with the railroads. In the background, however, another change was taking place in the field of shops and shop equipment. The old, small, inefficient repair shops were closed and the operations transferred to repair points better equipped to handle them economically. This was not the entire

extent of the change, however, for even in the big shops it was realized that the closing down of many of these smaller plants would eventually place a load on the principal repair plants that would tax their capacity when the business returned to normal.

One of the first indications of what was happening was observed over five years ago in a large shop when, on a visit after several months, the absence of many machine tools was decidedly noticeable. Questioned as to the reason the shop management informed us that many machines not immediately needed had been scrapped so that, when business picked up, there would be no alternative but the installation of modern tools. Back in 1935 another road retired 135 old machines and purchased modern equipment. In 1936 this paper carried the story of the replacement program on the Reading where 49 old tools were retired and modern machines installed. In the past year numerous such instances have come to our attention. Only within the past month the retirement of over 100 obsolete machine tools on one small road came to light. Retirements of shop machinery and equipment in the United States as a whole in the six years, 1930 to 1935, totaled over 30 million dollars, at an average annual rate of about five million dollars, while expenditures dropped over 80 per cent from 1930 to the low point in 1932, indicating a general disposition on the part of the railroads to pave the way for new shop equipment installations just as in the specific cases cited above.

Railroad buying of machine tools and shop equipment has got under way during the past 12 months. This is only a start, many extensive programs of modernization of car and locomotive repair shops are now being formulated.

Intra-Shop Transportation

The statement has been made that American industry spends about eight-tenths as much for the intra-shop transportation of material in the process of manufacture, as it spends on freight charges for raw materials and finished products combined. Obviously, this is a general statement which might be questioned, but if even approximately correct, it serves to emphasize the necessity of utilizing fully all types of equipment which promise to save labor in handling materials in all plant movements.

Railroads, as well as manufacturers in general industry, have already given considerable attention to this subject for it is especially vital in all railroad shops and engine terminals. Motor-driven tractor and trailer equipment, trucks equipped with electric cranes, lift trucks and skids are extensively installed to say nothing of electric shop cranes of various types, mono-rail systems, electric and pneumatic hoists, etc. In some instances the lift-truck and skid method of handling materials, for example, has been carried to the extent of loading heavy repair parts and processed materials on skids at a central repair shop, then moving the loaded skids to the store room, from which they are placed in a freight car and moved to the final point of use before the material is removed from the skids. This method requires a rather substantial investment in various types of skids and may conceivably be carried too far, but the principle is sound and within economic limits will unquestionably result in substantial savings of time and labor.

Specific evidence of the advantages of handling materials on skids was indicated in a survey conducted by the Department of Commerce several years ago which showed at that time a saving of from 25 to 90 per cent in the cost of handling materials on skids, as compared with older methods. In view of the savings which may be anticipated, there are probably few railway shops and terminals in the country in which it would not pay to make a re-survey of material-handling methods and make sure that full advantage is being taken of modern equipment and facilities to the fullest extent practicable in reducing this important item of shop-operating expense.

Fatigue Strength Of Press Fits

The recent articles by F. H. Williams on the failure of locomotive parts brings to mind the excellent work in research laboratories in this country and abroad undertaken to determine methods for increasing the fatigue strength of press-fit assemblies. Tests have proved that the fatigue strength of small press-fitted axles may be reduced to as little as one-half or one-third of their original strength. This is also true when crank pins are press-fitted in driving wheels, and when tapered piston rods are pulled into crosshead fits. Such reduction in fatigue strength is caused by (1) a concentration of stress at the end of the press fit where a small radius or shoulder is formed, (2) the location of a peak pressure between the two fitted members due to end restraint, and (3) corrosion at the edge of the fit resulting from a sliding action of the hub edge caused by contraction and expansion of the pressed-in member. In the past relief grooves in the pressed-in member, raised seats, and alloy or heat-treated steels have been used to relieve such stresses and prevent fatigue failure.

The tests previously referred to for studying fatigue failure involves surface rolling of the fit on the pressed-in member. This involves no new procedure for railroad men since plastically compressing wearing surfaces by rolling or burnishing has long been used in the railroad field for producing smooth wear-resistant surfaces for journal bearings. However, it was not until 1928 that O. Föppel at the Wöhler Institute in Braunschweig, Germany, discovered that increased fatigue strength of press-fit assemblies could be obtained by surface rolling.

Although there is considerable difference of opinion as to why surface rolling increases the fatigue strength of these fits, tests made since Föppel's original tests have shown that such increases are effected. For example, tests conducted by A. Thum in Germany in 1933 revealed the fact that rolling the axle surface gave about the same strength as the axle without the press fit or an improvement in fatigue strength of 69 per cent. These tests, and others made concurrently in this country, have used specimens up to 2 in. in diameter. However, they have proved the value of surface rolling as a means for increasing fatigue strength, and it can be assumed that benefits derived therefrom for small axles will also apply to full-size locomotive axles.

Tests made in this country in 1935 by O. J. Horger and J. L. Maulbetsch of the Timken Roller Bearing Company with 2-in. axles have shown that in each of two cases the application of surface rolling gave a fatigue strength about two and one-third times as great as without rolling. The tests were conducted with press-fit bearing races on the 2-in. axles, the fatigue strength of which without surface rolling after pressing on the race was 15,000 lb. per sq. in., and the strength after surface rolling was 33,000 lb. per sq. in. The original fatigue strength of the axle before rolling and before pressing on the race was 34,400 lb. per sq. in. The fatigue strength of 33,000 lb. per sq. in. was obtained after surface rolling at a roller pressure of 600 lb. An increase of this pressure to 1,200 lb. increased the fatigue strength of the pressed-in member to 34,000 lb. per sq. in.

The importance of rolling the surfaces of pressed-in members has made definite impressions as to its value even though most of the available data are for small specimens. However, some application has been made to full-size locomotive axles which have been failing at the wheel seats. In this instance the axles were first ground and then rolled at a pressure of 25,000 lb. per roller, which caused a reduction in diameter up to 0.001 in. Sufficient mileage has not been run on these axles at this time to determine what benefit may result. Future data on the subject may ultimately become available through the axle-testing machine recently installed in the laboratories of the Timken Roller Bearing Company, which is described elsewhere in this issue.

Economy in One Shop Operation

The use of turret lathes for machining locomotive tapered bolts seems to offer a field for study in reducing shop operating costs, event though it requires careful maintenance of reamers and constant-speed motors for the production of reamed holes from which bolt sizes can be obtained by plug gages. Elsewhere in this issue is described the means employed in one large railroad shop for machining over 300 bolts per day on one machine—all the bolts necessary for repairs to freight locomotives.

In observing the operation of this machine, one cannot help but contrast the machining of bolts in some shops on small engine lathes operated by apprentices or machinists who obtain hole sizes by calipers and set the taper to suit each bolt by tailstock adjustment. The value of such procedure is not underestimated from either an apprentice-training viewpoint or from the standpoint that the quantity of bolts required may not warrant the use of a turret lathe. However, the consideration of reducing shop operating costs warrants a study of what turret lathes can do in this particular shop operation.

New Books

AGENDA DUNOD CHEMINS DE FER. *By P. Place, chief engineer, Central d'Etudes de Materiel de Chemins de Fer. Published by Dunod, 92, Rue Bonaparte, Paris. 407 pages. Price, 22.85 francs.*

The Dunod agenda of railways contains chapters on right-of-way, motive power, car equipment, and operation. The right-of-way section of the 1937 edition has a table of track lengths and studies on ties of wood, metal, and reinforced concrete, and ties of wood and steel. The section on motive power discusses the resistance of trains, tractive force of locomotives, etc. Various types of passenger and freight cars, brakes, and heating and lighting of cars are among the equipment described in the section on car equipment. The section on operation contains data on safety devices, tariff receipts, taxation, etc. Miscellaneous data on steam engines, ferry boats and canals are also contained in this edition.

METAL STATISTICS, *Thirteenth Edition. Published by the American Metal Market, 111 John street, New York. 592 pages, 4 in. by 6 in. Price, $2.*

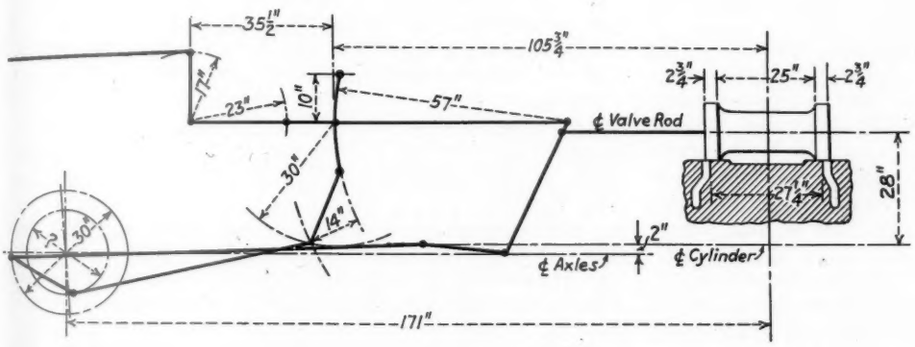
The thirteenth edition of Metal Statistics contains the same general statistical information on ferrous metals and non-ferrous metals and miscellaneous economic subjects as has appeared in earlier numbers. Most of the iron and steel production statistics are gathered by the American Iron & Steel Institute, while the production statistics on metals are, with a few exceptions, based mainly on figures furnished by the U. S. Bureau of Mines and the American Bureau of Metal Statistics. The Copper Institute, Inc., has also released certain figures which permit a more comprehensive presentation of statistics on copper. Prices given in this volume are based mainly on the daily quotations appearing in American Metal Market and represent wholesale selling prices.

THE READER'S PAGE

A Tough Valve Problem

To the Editor:

We have operating over one of our divisions six passenger locomotives of the 4-8-2 type, with 27-in. by 30-in. cylinders, carrying 200-lb. boiler pressure. The piston valves are 14 in. in diameter, driven by the Walschaert gear. The lead is ¼ in.; steam lap, 1⅛ in.; exhaust clearance, ¼ in.; port width, 1⅞ in.; travel in full gear, 6½ in.; eccentric crank, 18 9/16 in.; eccentric-crank throw, 20 11/16 in.; link radius, 57 in.; link foot 30 in. from link trunnion and offset 14 in; combination lever, 3¼ in. (top) by 31¾ in. (bottom); trunnion link, 20¼ in.; eccentric blade, 58¾ in.; main rod, 102 in.; center line of cylinders 2 in. above center line of axles; valve 25 in. between admission edges and 30½ in. over exhaust edges; between admission edges of valve ports 27¼ in.; direct in forward motion: link slotted 12 in. above and below trunnion center. The driving wheels are 69 in. in diameter.



Can you tell why a valve gear with this layout causes pounding in 25 per cent cutoff?

These locomotives are reported as pounding badly at short cutoff; due to this condition the main axle bearings and main-rod bushings are renewed often. Several tests have been made by our traveling engineer riding these engines on their regular runs to ascertain at what position the reverse lever should be placed on the quadrant to overcome this compression kick. He has decided that at no time should the lever be worked closer than one inch from the center of quadrant. In checking the cutoff with the reverse lever in this position we find that cutoff was occurring at 43 per cent of the stroke. We then marked a point on the quadrant that would indicate to the engineman that he was working his engine at 25 per cent cutoff. He then reports bad compression kick at 25 per cent, but all right at 43 per cent, except that the boiler requires too much water, which results from greater steam consumption at the longer cutoff.

What is wrong with the valve gear that 25 per cent cutoff cannot be used? We have had these engines on valve rollers several times trying to find a solution; so far no changes have been made.

What length eccentric crank should be used with 20 11/16 in. throw to give ¼ in. constant lead? Will the 18 9/16 in. eccentric crank with 20 11/16 in. throw give a constant lead? What effect would an eccentric-crank throw of 21⅝ in. with an 18 9/16-in. crank have on the cutoff? What changes could be made in the valve design to eliminate excessive compression kick at 25 per cent cutoff.

K. B. G.

Interchange Rules 68 and 75 Inconsistent

To the Editor:

It was with much interest that I read in the March issue of the *Railway Mechanical Engineer,* the excerpts from J. C. Hayes' paper before the Eastern Car Foreman's Association in New York, January 8, 1937. I heartily concur in Mr. Hayes' proposals. He shows by his suggestions that he has a sympathetic understanding of the problems of the car inspector.

I was especially interested in that particular clause with reference to responsibility for cut journals, which coincides with the thought I expressed in my article in the *Railway Mechanical Engineer,* March, 1936, captioned, "Are Interchange Rules 68 and 84 Fair?" In that article I attempted to analyze the causes of slid flat wheels and cut journals and expressed the thought that such defects should be conditionally classified as owner's responsibility.

The inconsistency of Rule 68 is apparent when you realize that this rule is classed as delivering line responsibility and Rule 75, brake burns, is classified as a handling line responsibility, when both defects are produced under identical conditions. Both defects are the result of one of the three following causes—defective brake mechanism, improperly proportioned or adjusted brake rigging, or moving car with hand brakes set too tightly. I think that any practical car department supervisor will agree with me when I say that approximately 90 per cent of wheels removed from cars, account of being slid flat or brake burned, were due to the first mentioned cause, the degree of damage depending more or less on the adjustment of the brakes.

If the brake rigging is properly adjusted and full braking power applied, the wheels will be slid flat. When the air brake fails to function properly, if not too tightly adjusted, the result may be brake burned wheels. Hence, as the condition of the air brakes and brake rigging is definitely owner's responsibility, why should not slid flat wheels found under cars having these parts de-

fective, or improperly adjusted, be designated as owner's responsibility, as is the case with brake burned wheels? But there should be a qualifying clause in the rule to fix the responsibility on handling line for sliding wheels when caused by moving car with hand brakes set. In the absence of any definite information it will be assumed that wheels were slid flat as result of handling the car with hand brakes set, if the air-brake test shows the brakes to be properly operative, and a check of the brake rigging shows it to be properly adjusted and proportioned.

It is unreasonable to hold the handling line responsible for the development of cut journals on foreign cars in its possession, when the main contributing factors in the development of this defect are all classed as owner's responsibility. Let us summarize these factors: Worn, defective or improper fitting journal bearings and wedges; worn or missing dust guards; journal-box lids missing or improperly fitted; inferior packing; trucks out of alinement; mal-concentricity of wheels, due to slid flat, worn chill or improper boring. The correction of any or all of these conditions is properly chargeable to car owners; hence, if a car develops a cut journal as a result of any of these conditions, this, too, should be charged to the car owner.

If any program to reduce the issuance of defect cards in interchange is advanced in line with Mr. Hayes' proposal, and I think there should be, these two propositions should be given consideration, as they no doubt account for a vast number of defect cards issued in interchange.

The views of individuals in proposing modifications in the rules of interchange cannot always be gotten over to the A.A.R. committees, but they can be put before the proper committee when endorsed and properly presented by car foremen's and interchange inspection organizations. Hence I would suggest that secretaries of such organizations, throughout the country, bring these matters to the attention of their respective organizations for discussion.

H. A. McConville,
Foreman, Car Department, Louisville & Nashville.

Carrying Scrap In the Storehouse

To the Editor:

In your publication for December 1936 there appeared on the reader's page under the heading of "Carrying Scrap in the Storehouse" an article by W. H. Shiver, which, in my opinion, contains several statements as facts in regard to the dismantling of equipment and purchase of second-hand parts that can hardly be substantiated if investigation were made as to actual practices on various railroads. It is regrettable, of course, if conditions described by Mr. Shiver exist on any road, but the statement that such conditions generally exist should, we feel, not pass by without challenge.

The article referred to states: "Since 1929 large numbers of cars have been retired. The majority of this equipment has been dismantled by contractors who sell back to the railroads whatever material they wish." The facts of the matter are that approximately 70 per cent of all cars being destroyed are dismantled by railroad forces and not by contractors. Sixteen per cent of all cars being dismantled are handled by contractors but with the railroad company reserving the right to retain or re-purchase certain materials. This leaves only approximately 14 per cent of dismantled equipment that is being sold on wheels without any reservation as to return of usable materials.

These figures clearly indicate the error in Mr. Shiver's article in stating that the majority of the dismantling work has been done by contractors. As a matter of fact, the Purchases and Stores Division of the A.A.R. has for many years recommended that dismantling of cars should be done by the railroad company's own forces unless there are some unusual circumstances which would make the sale of the equipment on wheels to contractors advisable.

Mr. Shiver's article also contains the statement that large amounts of car materials such as truck springs, brake beams, couplers, truck sides, etc., have been purchased from contractors dismantling equipment and that much of this material is not up to A.A.R. specifications, resulting in delays to the Mechanical Department as well as loss of money in purchasing these materials at a premium over their scrap value.

If such conditions exist, we cannot but feel that it is the exception rather than the rule. Our investigation indicates that, where roads have found it desirable to purchase such second-hand material from dismantling contractors, they have arranged for just the same care in the inspection of this material by the engineer of tests or other inspection forces as they would use in the inspection of new materials. If such inspection was not arranged for, it is a man failure which should be corrected locally; and it would be well for the officers in charge to acquaint themselves thoroughly with the recommendations of the Purchases and Stores Division, A.A.R. on this subject.

In conclusion, for the benefit of those under whose jurisdiction such activities fall, I would like to call particular attention to the following from the 1926 proceedings of the Purchases and Stores Division annual meeting:

"Inspection of reclaimed materials—No reclaimed materials should be furnished for use until they have been inspected and accepted for the service intended by the using department or the authorized inspection department as nothing will more rapidly discredit the reclamation enterprise than to attempt to furnish materials that do not meet the required specifications or are unsatisfactory for the use furnished."

Many other recommendations from the Purchases and Stores Division, A.A.R. in regard to the dismantling of equipment by railroad company forces and other reclamations practices could be cited but space will not permit.

Generally speaking, we cannot agree that conditions are as described by Mr. Shiver, but, if such conditions do exist on some individual railroad, then the remedy for correction can easily be applied on that property by dismantling its own equipment if possible which will permit retaining usable second hand materials and avoid purchase from contractors. In case this is not possible, then an arrangement for proper inspection of materials purchased should be inaugurated so as to insure only good usable material being accepted.

J. C. Kirk

Line-Smashing Superintendent.—J. J. Gallagher, recently promoted to superintendent of the North Texas division of the Missouri-Kansas-Texas, on which division he has been division engineer for several years, is probably the only railroad superintendent with an All-American football background. In fact, Gallagher was the first player west of the Mississippi to be selected on Camp's All-American team. He did his playing at the University of Missouri.

Gleanings *from the* Editor's Mail

The mails bring many interesting and pertinent comments to the Editor's desk during the course of a month. Here are a few that have strayed in during recent weeks.

Walt Wyre Took a Vacation

I must say that your short stories by Walt Wyre are anxiously looked forward to, but for the past few months no Wyre. He must have been around some, as the stories are right in accord with present-day problems on any railroad. I may be the only one that looks in the index to see if Mr. Wyre has a story. He put the humor in the magazine, and everyone enjoys true humor and fun. (Walt Wyre is back again in this issue. You are not the only one who let out a howl about his absence. His return will cut down our correspondence and postage costs.—Editor.)

Make Best Use of June Conventions

The A. A. R. convention with its exhibit at Atlantic City in June will be the first in seven years. During this time many improvements have been made in old devices and many new devices have been brought out. It seems to me that this will give the railroads an opportunity to educate their younger supervisory forces with reference to the new and improved devices that have been developed by the supply companies during this time. We know that railroad forces in all departments were cut to the bone during the depression we have just gone through. If this matter could be brought to the attention of the proper railroad officials they would, in all probability, arrange to have a number of their younger supervisory staff attend the convention, if only for a day or two. It seems to me that the opportunity to compare competitive devices and have them explained is one that they should not have overlooked.

How About Raising Bull Frogs?

I have just noticed the agreement between the railroads and the labor unions in connection with the railroad pension law. The clause in this ruling or agreement which bothers me is under Section 8: "No annuity will be paid any employee who retires and engages in regular gainful employment in some other line of work." I am interested in knowing just how this ruling is likely to be interpreted. Being just as active mentally as I ever was in my life, so far as I can tell by comparisons which I have made very carefully, I have been planning certain activities when I reach the point of my forced retirement. For instance, I have purchased a farm with the expectation of operating it. I do not care to be retired and sit down and twiddle my fingers. According to life insurance standards, my life's expectation when I retire will be in the neighborhood of ten years. If I live to be as old as my father, it will probably be 14 or 15 years. I feel very sure that what is really intended by the pension agreement is that where people are working for someone else they cannot accept employment elsewhere, but if a man has sufficient capacity to project an organization for production and employs labor, or is in a position to use his previous experience and initiative to produce things, such as inventions and the exploitation of same, or consulting engineering work or similar things, that he will not be put in the category of the craftsman or laborer, or the man that has to be directed in his work and is employed by the day. I have a friend who is to be retired just before I do, and he like myself is active mentally. He has been thinking of starting a duck farm, and jokingly he said he wondered if they would interfere with him if he went into bull-frog raising.

Why Cars Fail on Line

The "Car Failures on Line" (Gleanings page, your March issue) can, with very little thought, all be traced to inadequate time allowed to inspect and repair cars properly. In each of the items mentioned, if time was allowed for careful inspection before the cars left a terminal, and if they were not allowed to leave unless they were actually fit for service, there would be no problem, let alone a big one. Most every mechanical failure, certainly all that are mentioned, can be traced back to some carman who didn't have, or wouldn't take, sufficient time to do his work properly. Ninety-nine times out of a hundred, the only reason why car inspectors take chances with cars is because of a lack of understanding of switchmen, yardmasters and dispatchers on what a car and a carman can do in a given length of time. When one inspector is required, or supposed, to "inspect"—properly speaking, race around—from 80 to 100 cars in 30 to 45 minutes, the railroads have no cause for complaint. If the delays that result from such haphazard "inspection"—seeing that they have wheels, are coupled and with nothing dragging—have caused loss of business and other unnecessary expense, the railroads have only themselves to blame.

Waste — In More Ways Than One!

I have wondered many times why, since freight cars are interchangeable and sometimes spend most of their time on foreign lines, we cannot use a common standard waste in the journal boxes. I agree with Vice-President C. E. Smith of the New Haven in his statement at the December meeting of the New England Railroad Club: "One railroad," he said, "will buy a very expensive waste and another railroad will buy a very cheap waste. I don't understand why mechanical men will travel long distances, send out questionnaires, assemble information, sit down and consider all of the information in committee meetings, at great expense to the railroads, and finally adopt specifications; then everybody goes home and pays no attention to the specifications whatsoever. Why do we choose the specifications in the first place if they are not to be followed? * * * There is an agency of the railroad that has authority that has been given to it by the railroads to make research that is necessary and adopt proper specifications. That is the Association of American Railroads."

The Three-Legged Stool

In comments on the Wagner Act and the relations between capital and labor which have appeared in the newspapers recently, reference has been made to the successful way in which these matters have been handled in the railroad field. I am afraid that these commentators have overlooked the way in which some of the railroad labor leaders are working outside of these agreements and are attempting to bring political pressure to secure unwise legislation. President John M. Davis of the Lackawanna Railroad made a very pertinent suggestion in his address before the annual dinner of the Central Railway Club in Buffalo. "In connection with labor and management," said Mr. Davis, "I read a little article the other day that amused me. This story said that a newspaper reporter asked Mr. Andrew Carnegie, in an interview in Pittsburgh, which was the most important in business—management, capital or labor. Mr. Carnegie's reply was a question—'Which is the most important leg under a three-legged stool?' Everyone wants more money and more leisure, but further reductions of hours would reduce employment. In my opinion, the shorter work day would increase railroad payrolls to the extent of about six hundred million dollars per year, or 33 per cent. The railroads, at existing rates, would be unable to meet that increased cost. The problem, therefore, presents new difficulties that warrant serious deliberation."

With the Car Foremen and Inspectors

Milwaukee Uses Plywood Extensively In New Cars

The Chicago, Milwaukee, St. Paul & Pacific, in the development of new passenger and freight cars, has produced many new standards, both in design and construction, over the conventional-type cars, the objective sought being modern cars light in weight yet safe and suitable for all interchange service.

One important departure has been the use of plywood in place of tongue-and-groove linings in the interior. While the initial cost of the plywood is greater, this is partially offset by the economical application of large sheets which eliminates a portion of the blocking and nailing strips formerly required, and which effects the labor cost. Further, the plywood has greater strength permitting of lighter sections. The following paragraphs cover in a general way the application of this material to the various classes of Milwaukee cars built in the past few years.

Passenger Cars.—During the past two years, the C. M. St. P. & P. has built at Milwaukee Shops over 100 new passenger cars, which includes coaches, baggage and mail, diners and other special cars. All of these cars embody all-welded steel construction, with a weight reduction in the case of the new coach, for example, to 90,000 lb. which may be compared with 160,000 lb. for a conventional riveted steel car. The application of plywood to the inside of these cars has been one of the features to obtain this weight reduction. In the case of new coaches, all of the flooring and partition panels are ¾-in. 5-ply fir plywood and, for the side walls, poplar or basswood plywood is used as a base for the imported veneer faces.

For the baggage and mail cars, due to the heavy loading, the floors are made of 1¼-in. 7-ply, side walls of ¾-in. 5-ply, and the ceiling ¼-in. 3-ply, all fir plywood. Over the floor and outside of the door openings 1-in. by 2-in. oak strips, spaced 1¼-in. apart, serve for two purposes, one to provide drainage for fish loading, and the other as a protection to the floor. In between the doors 1-in. tongue-and-groove oak flooring is applied as this section suffers greatest abuse.

Baggage cars with this installation have been in continuous service over two years and indications are that the material is standing up without apparent defects and should last for a substantial period of time before any replacements will be required.

Freight Cars.—The first test application of plywood for lining Milwaukee freight cars was made in July, 1934, to an all-welded 40-ft. steel box car. Since then, this car has been loaded with such commodities as flour, grain, lumber, feed, mill work, etc., and has been handled repeatedly under load over long distances. There have been no complaints about the lading being damaged at any time due to defects within the car itself, such as rough inside finish, or by water, cinders or soot, seeping into the car.

Close-up view showing plywood partition panels in Hiawatha parlor car

On the strength of this showing it was decided to build 1,000 new automobile cars which were recently completed at Milwaukee Shops. The sides and ends of these cars are lined with ¾-in. 5-ply fir plywood and the ceiling with ¼-in. 3-ply fir plywood. All sections are fastened to fir strips bolted to the car body, and the plywood fastened to the fir strips with wood screws; at joints not backed up with fir strips ¾-in. by 4-in. plywood cleats are used.

The principal feature of this application was the method of applying the plywood which permitted re-

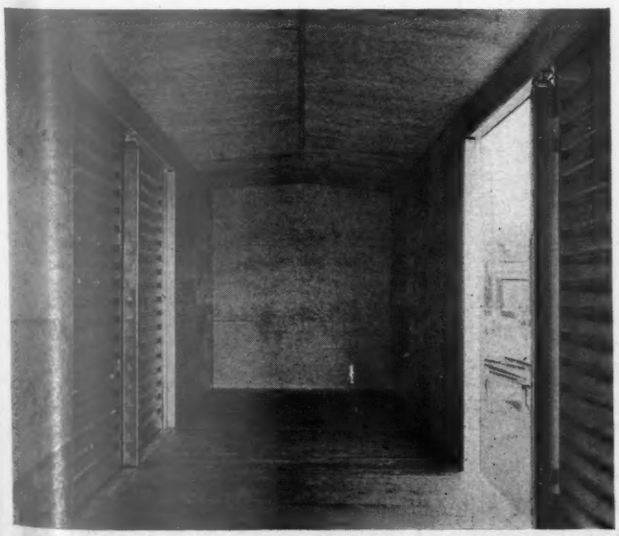
Interior view of Milwaukee all-welded steel coach showing the application of plywood inside finish

One of the rebuilt Milwaukee cabooses with ceiling made of plywood

moving either the flooring, sides, or ends, without affecting each other; also the plywood is attached directly to wood to prevent any metal to metal contact and to prevent any frost penetration through bolts or screws. For reasons stated above, the use of large panels has reduced the labor cost both from a milling and installation standpoint; also it provides a smooth interior finish.

Another feature is the ¼-in. plywood ceiling. This is a new departure from the conventional type of box car with a steel roof and is expected to eliminate, to a large extent, damage to lading due to the sweating of the steel roofs, which allows moisture to gather and drip on the lading. The complete inside lining of the automobile box car, including the roof, with plywood is clearly shown in one of the illustrations.

To protect the plywood panels from moisture, all panels were dipped in a Laucks sealer and as a further protection the backs of the panels are given one coat of red mineral paint. After these panels are applied to the car, the entire face of the panels, which includes the floor, are sprayed with an aluminum paint, the latter having two purposes: first, from the appearance and cleanliness standpoint; and, second, as an additional precaution for moisture prevention.



A Milwaukee 50-ft. 6-in. automobile box car completely lined with fir plywood

While a weight reduction of about 9,000 lb. in the 50-ft. 6-in. automobile box car is due primarily to the welded construction, an appreciable part of this weight saving may be credited to the plywood lining. It is also interesting to note that in a derailment of some of these box cars, where the brakes were applied in emergency and the loads shifted enough to bulge the steel ends slightly, the ¾-in. plywood end lining was bent, but not split or broken, and came back nearly to its normal position as soon as the car was unloaded.

Caboose Cars.—Still another recent application of plywood to Milwaukee equipment is its use for lining the ceilings of some rebuilt cabooses, one of which is shown in an illustration. The principal feature of this car is the replacement of the conventional cupola with a bay window on each side of the car, but among other items of interest is the installation of a ceiling, made of ¼-in. 3 ply fir plywood and designed to improve the interior appearance of the car as well as to make it warmer in winter and cooler in summer.

Questions and Answers On the AB Brake

146—*Q.—What is the position of the piston at this time in relation to that of the emergency piston?* A.—It is to the extreme left, out of contact with the emergency piston.

147—*Q.—When does the service piston assume retarded recharged position?* A.—It assumes this position during release, at such time as the brake-pipe pressure is over 3 lb. higher than that of the auxiliary reservoir.

148—*Q.—What movement results from this differential?* A.—The return-spring, at the end of the service-piston stem, is compressed, as a result of which the piston, the slide, and the graduating valves are moved to the extreme right.

149—*Q.—What is the effect of the movement just described?* A.—One of the feed grooves in the service piston bush is closed, reducing the rate of flow from the brake pipe to the auxiliary reservoir.

150—*Q.—Does this movement take place all over the train?* A.—No. Only the front-end brakes assume retarded recharge position.

151—*Q.—What benefit is derived from this arrangement?* A.—While the front-end of the train is restricted, the brake-pipe and the auxiliary-reservoir pressures are built up on the rear portion at an increased rate, providing a uniform recharge throughout the train.

152—*Q.—Is the rate of brake-cylinder release the same in full release as in retarded recharge?* A.—Yes. The connection to the exhaust is the same in both positions.

153—*Q.—What eliminates the possibility of the service graduating valve becoming unseated during the initial charging of the equipment?* A.—The service slide valve blanks the service port, cutting off the flow of air to the graduating valve.

154—*Q.—When a service brake-pipe reduction is started, what movement of the service piston results?* A.—The piston moves far enough to the left for the spring guide at the end of the piston stem to engage the slide valve when the spring is slightly compressed.

155—*Q.—Is communication now open between the brake pipe and the auxiliary reservoir?* A.—No. Both feed grooves are closed by the piston.

156—*Q.—In what capacity does the spring and the spring guide act?* A.—They act to stabilize what is known as the preliminary quick-service position so that a predetermined differential of auxiliary-reservoir and brake-pipe pressure is required to move the service piston and the graduating valve to this position.

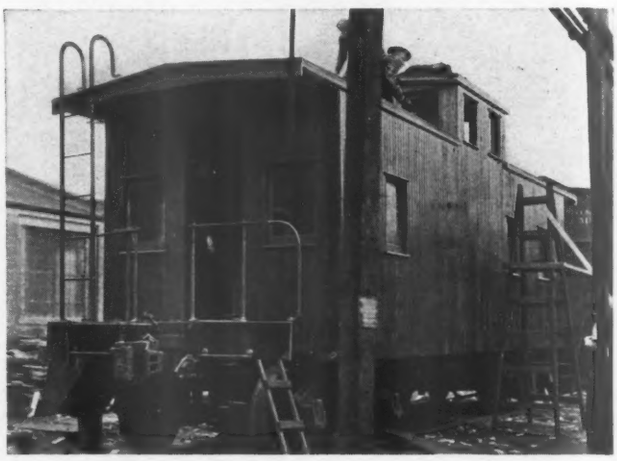
157—*Q.—What does this prevent?* A.—This prevents undesired quick-service activity, induced by moderate fluctuations of the brake pipe-pressure.

158—*Q.—Should the brake-pipe reduction continue, what is the result?* A.—Sufficient differential is created to compress the piston spring, moving the piston and the graduating valve until the ports register via the slide valve, establishing communication between the brake-pipe and the quick-service volume.

159—*Q.—What is the result of this operation?* A.—A local reduction of brake-pipe pressure.

160—*Q.—What does this bring about, in so far as the train is concerned?* A.—This preliminary local reduction, controlled by the graduating valve, results in rapid-service action throughout the train.

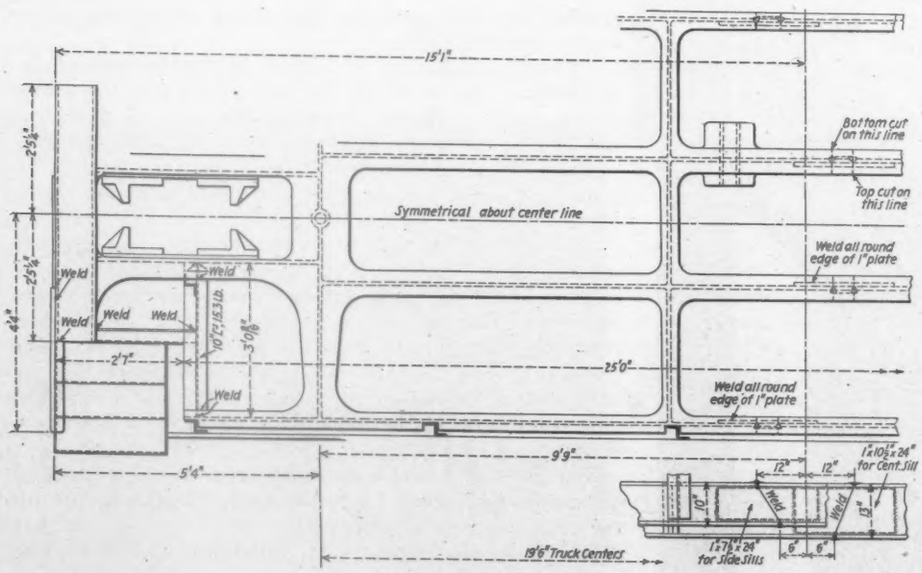
Two of the original locomotive tender underframes before cutting in two—The rear and front ends are shown in the top and bottom frames, respectively



One of the cabooses with the cast-steel underframe being rebuilt

Tender Underframes Converted for Caboose Service

An interesting example of the conversion of cast-steel locomotive tender underframes for caboose service is that involved in a recent rebuilding job performed by the New York, Ontario & Western at its Middletown, N. Y., shops. Because of the requirements of service this road found it necessary to equip new cabooses with heavier steel underframes than the former riveted rolled-steel design. Recently several locomotives that were equipped with cast-steel tender underframes were retired from service and it was desired to make use of these frames. It was, of course, not possible to use tender underframes as they were because of the fact that the front end sill of the original underframe was designed for the engine and tender buffer. Two tender underframes were therefore cut in two and two rear ends were welded together to form the caboose underframe. One of the illustrations accompanying this article shows two of the original tender underframes as removed from the locomotive; the drawing shows the reconstructed arrangement of the frame and the other illustrations show a rebuilt caboose nearing completion.



General arrangement of one end of the caboose underframe—The location of the welds in the four sill members is shown in the plan view and the manner of splicing the joint and applying the splice plates is shown at the lower right corner of the drawing

The splice in the frames was made about a transverse center line 15 ft. 1 in. from the frame end so that the completed caboose frame was 30 ft. 2 in. overall.

The splices in the outside members were made at a point 12 in. on one side of this center line and the splices in the inside members were 12 in. on the opposite side of the center line, so that the joints in the completed frame were staggered in location across the frame. The drawing shows clearly where the welds were made and the manner in which the splice plates were welded to the webs of the four members. The outer edges of the splice plates were electrically welded. All of the other welding was oxy-acetylene. The four sill members were welded simultaneously in order to obtain approximately the same expansion on each member, four welding operators being used on the job at one time.

Air-Operated V-Block

By A. Skinner

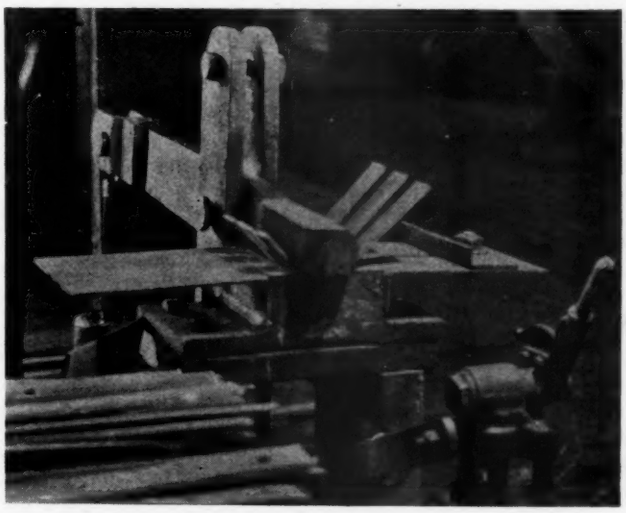
In the rebuilding of automobile cars, brackets of different shapes are required and, to speed up the work, it became necessary in one shop to find something more than an ordinary V-block such as is commonly used to bend one piece at a time. After experimenting with several different methods of making these brackets, the idea of using an air-operated V-block designed to bend three or more brackets in one operation was considered worth trying.

The result was the development of a shop-made device which consists of a V-block rigidly supported at a convenient elevation, a heavy lever arm and fulcrum and a 12-in. air-operating cylinder, all mounted on a substantial steel base. The base consists of two 6-in. channels with a 1-in. cover plate which may be either riveted

Shop made device for forming uniform angle bends in steel brackets required for car work

or welded in place. The bottom die, or V-block, is a steel forging, provided with a vee of the proper angle and depth cut in the upper surface, and bolted to a rigid steel channel structure, about 24 in. high, firmly secured to the base channels. The fulcrum just back of this table is made of two pieces of 1-in. by 5-in. by 48-in. iron, bolted to the base channels and separated 1⅛ in. at the top so as to accommodate the lever which swings on the fulcrum pin.

The ratio of lever arms is two to one; the short arm, machined to the same angle as the V-block and subsequently case-hardened, is 12 in. long, and the other arm 24 in. long. This lever is made of 1⅛-in. by 5-in. stock, thickened at the operating end to 3 in., and provided with a substantial slotted jaw at the long end for connection



The work-supporting table and length gage—Three brackets have just been formed

to the push rod. The air-brake cylinder is secured to the base channels by being bolted to an end plate, and additional stiffness is secured by the application of a rectangular bracket made of ⅜-in. by 2-in. scrap iron. The operating valve is a ¾-in. straight-air valve, mounted conveniently and piped to the air cylinder as shown in the illustration.

Referring to the close-up view which shows this forming device in operation, details of the work-supporting table are quite clearly indicated. A flanged steel plate is bolted to either side of the V-block, these plates being made of ⅜-in. stock 8 in. wide. The plate at the right is provided with a ⅝-in. center slot, through which is applied a bolt for holding the stop plate, or length gage, in whatever position is desired.

With the use of this device, a true angle can be bent in cold steel bar stock up to ½-in. by 3-in., the number of pieces bent at one time depending, of course, upon their width, since the total width of the die is only 8 in.

Bacteria Control in Air-Conditioning Cars

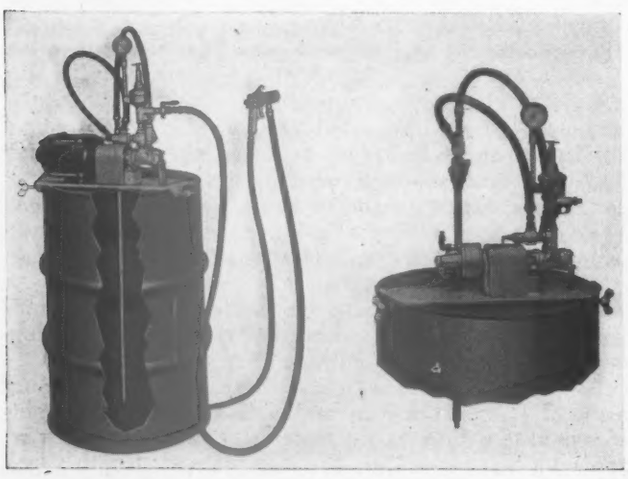
Extensive studies have indicated that bacteria control in air-conditioning systems is a protective measure that adds another valuable feature to the proved health and commercial advantages of air conditioning. In many types of air-conditioning systems, economy requires the re-use of the water employed for washing the filtered air before it is returned to the cars or rooms. It is a known fact that a considerable amount of organic matter from recirculated air is introduced into the recirculated wash-water, providing sufficient food material to allow

bacteria to grow and increase rapidly. Due to this, algae and slime growths accumulate on surfaces directly in contact with water, and thus interfere with the efficient operation of the system. In addition, surfaces of coils used for heating and cooling air also accumulate deposits and re-infect the washed air, so that air washed with water of high bacterial content or that contacts bacterial growths on surfaces, becomes a carrier of infectious organisms detrimental to health.

Oakite Products, Inc., through its Research Division, has developed a new material known as Oakite Airefiner that is said to solve this problem. When added to the recirculating water used to wash or scrub air, Oakite Airefiner keeps the wash-water sterile and prevents the growth of slime and algae deposits in the system. This material is said to be completely soluble, transmits no odor to water or air, and provides a stable, colorless solution that is safe and non-toxic. It is non-corrosive to metal surfaces, and helps prevent water scale formation. Reports on its use indicate that it is economical, only very small amounts being required to destroy bacteria and to keep water sterile.

Circulating Pump Attached To Shipping Container

The DeVilbiss Company, Toledo, Ohio, has announced a Type QB circulating pump for delivering clear varnish, clear lacquer and other non-pigmented finishing material from the shipping container directly to the spray gun. It is the first equipment of its kind to be offered by this company and has been perfected after three years of experiments undertaken to eliminate the hazards of the old-type pressure equipment when used on old or weak drums. The pump draws material out of the drum and generates sufficient pressure in the pump head to feed the fluid to the spray gun at any correct predetermined pressure. The speed of operation is limited only by the operator's ability to handle the gun. Reports from plants where the unit has been installed indicate time savings of 25 per cent to 40 per cent over gravity or pressure drum methods. A consistently higher quality of work is said to be effected by the unvarying fluid pressure at the spray gun.

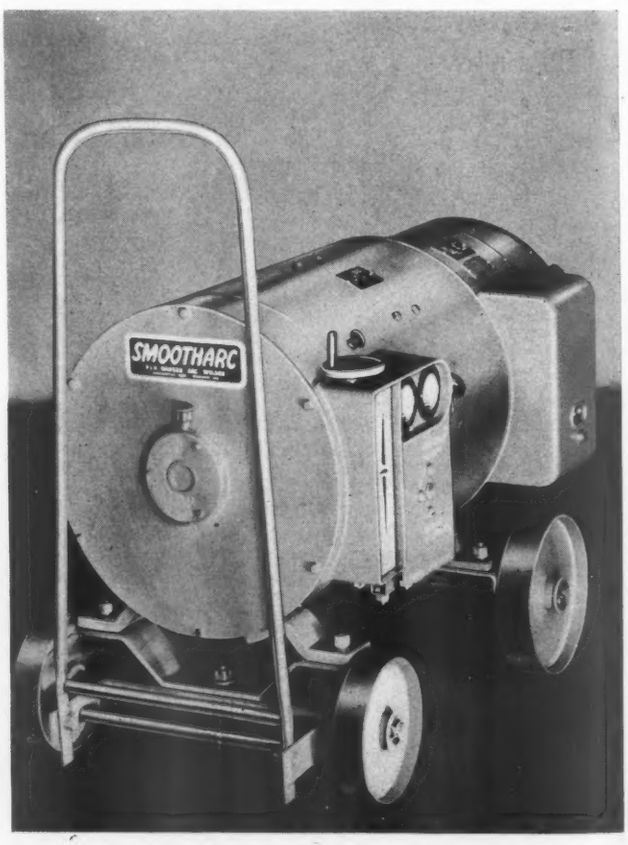


Left—DeVilbiss motor-driven circulating pump for varnish and lacquer attached directly to the shipping drum. Right—The application of an air motor to the pump

The unit is available with either electric-motor or air-motor drive, and consists of (1) a steel base plate on which is mounted the motor, pump, relief valve, and fluid regulator, and (2) a fluid suction and return assembly which can be inserted and interchanged in drums with ¾ in. or larger openings. The unit and hose can be cleaned each day after use. Protection against dirt or foreign substance getting into the finishing material is provided by an adjustable sliding collar on the tube entering the drum.

Harnischfeger Smootharc Welders

The Harnischfeger Corporation, Milwaukee, Wis., announces a line of simplified P. & H. Hansen Smootharc welders featuring single current control, self-excitation and internal stabilization, the qualities deemed necessary for fast, steady welding, deep penetration and uniform metal deposit. This line of welders is built in two styles vertically mounted in 75-, 100- and 150-amp. capacities and horizontally mounted in 200-, 300-, 400- and 600-amp. sizes. Both models are compactly built without projecting parts to permit easy portability.



Smootharc self-excited welder

Single current control, the outstanding feature of the welders, is made possible by a patented design of shifting generator brushes. By means of a micrometer-screw shifting device an infinite number of current settings is secured and the voltage is maintained automatically at a high value. A turn of one controlling dial gives the desired welding current.

All Smootharc welders are self-excited by means of a set of auxiliary brushes placed ahead of the main brushes and connected to an auxiliary shunt winding. No extra

commutator is needed, thus saving weight, space and wearing parts. The generator is designed to permit the shifting of both main and auxiliary brushes, thereby making available the proper amount of excitation for each current setting.

Self-stabilization is secured in the welders through the use of interpole winding extended to the main pole shoes in such a manner that it serves the dual function of interpole winding and stabilizing winding. This causes less spatter loss because speedy arc recovery is secured through the combination of short-circuit winding and the magnetic bridge located in the main field magnetic circuit. A lower cost per pound of metal deposited is claimed for the unit.

The generator instruments are mounted in a single control panel built into the side of the streamlined motor housing. The construction is rolled-steel, arc-welded, and all steel parts, field ring, and pole shoes are annealed to give the highest possible quality magnetic field for generator fluxes.

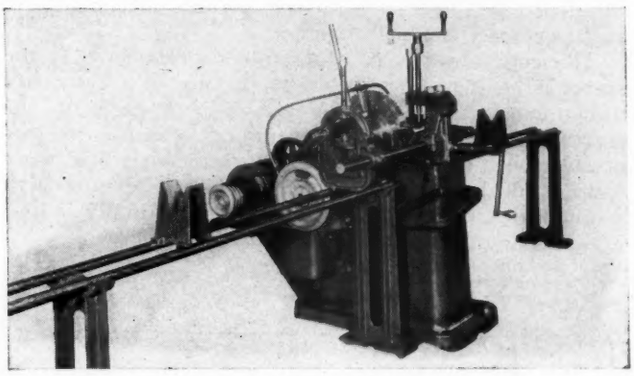
Air-Leak Testing Compound

An air-leak testing compound which meets with the A.A.R. specifications of being a soap has been developed by the Magnus Chemical Company, Garwood, N. J., to provide an extremely tough-skinned bubble with several times the size and visibility of a bubble made with an ordinary soap. Another feature is the fact that the air-leak testing solution made with the compound will not jell or stiffen on standing, but remains in the form of a viscous fluid which is simple to apply, and the results easy to observe. It will not harm metal, rubber or hands. It is not a new or untried material, except so far as widespread use is concerned. It has been supplied for over two years to one of the larger railroads, for which it was originally developed, and supplied likewise to a number of smaller roads.

The preparation, designated as the Magnus No. 51 air-leak testing compound is used in quantities of 2 or 4 oz. per gal. of either warm or cold water to make up a thick liquid soap solution which is painted over all connections as stipulated in A.A.R. specifications. Bubbles formed where any leaks occur will have several times the size and consequent visibility of those formed by any ordinary soap solution.

Rotary Saw for Small Bar Stock

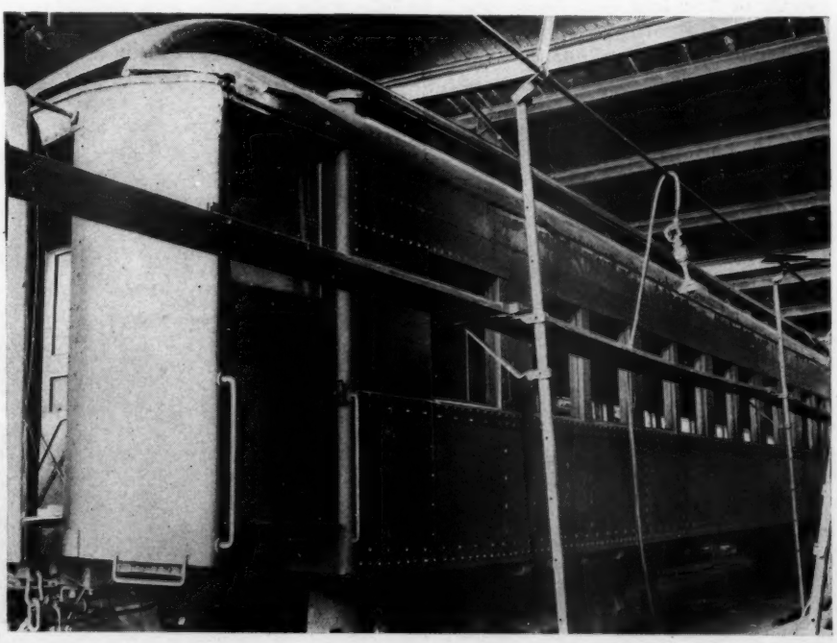
The illustration shows a small circular saw arranged with support track and stock feed for cutting small round bars in multiple. The vise has capacity for holding eight 1⅛-in. round bars at one time; other sizes are held in proportion. The cut is made in 1½ min. The machine uses a 16-in. diameter inserted-tooth saw blade.



Cochrane-Bly saw for bar stock

The saw is driven by a 2-hp. 1,200-r.p.m. motor through multiple V belts protected by a welded steel guard. If desired the machine can be furnished with a three-screw vise for holding the pieces being cut off outside of the saw blade. It is provided with a lubricant pump with flexible tube and distributing nozzle over the saw blade. This machine can also be arranged for cutting single bars, and is provided with three changes of feed for hard and soft stock. It weighs about 1,600 lb. and occupies floor space 29 in. by 50 in. It is made by the Cochrane-Bly Company, Rochester, N. Y.

* * *



Coach Roof Repairs

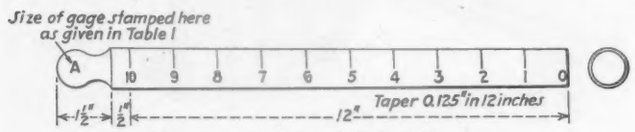
Corrosion at the joint between the roof and letter board on this passenger car necessitated extensive repairs. The road, not desiring to rebuild the car and apply a new roof, made temporary repairs suitable for four or five years service as shown in the illustration. The roof sheets, all around the sides and ends of the car, were cut away for a width of about five inches and a patch sheet applied. The patch sheets were fastened to the side sheets, where through bolts could be used, by drilling and applying ¼-in. stove bolts spaced about 2½ in. centers. The upper joint, to the roof sheets, was held in place by Parker-Kalon self-tapping screws. After fastening with the bolts and screws the joints, top and bottom, were welded, ground down to a smooth surface and refinished.

IN THE BACK SHOP AND ENGINEHOUSE

One Machine Produces 300 Tapered Bolts per Day

All tapered bolts for freight locomotive repairs at the West Albany shops of the New York Central System are made on a turret lathe, which has an average production of over 300 bolts per 8-hr. working day. This rather high production of bolts with one machine is facilitated by a principle of cutting-tool adjustment developed at these shops which permits machining the bolt to correct size with one cut.

The concentration of tapered-bolt production at the turret lathe is made possible by the use of a system of measurements involving the use of plug gages in the erecting shop. The measurements taken in this manner are furnished to the turret-lathe operator on a bolt order form. The bolts are produced to these sizes and with a standard taper of 1/16 in. to the foot. Naturally, standard tapered bolts could not be used unless clean, round holes of uniform taper are reamed in the locomotive parts for which the bolts are intended. To assure this, all 1/16-in.-per-ft. tapered reamers used in the shop are kept in first-class condition and constantly checked by the tool-maintenance forces. A series of hardened tapered plug gages are used for obtaining the hole size. As shown in one of the illustrations these gages are 12 in. long tapered 1/8 in. per foot and have ten graduations spaced 1.2 in. apart; thus, each plug gage can be used for obtaining hole sizes over a range of 1/8 in. The range of gages used is shown in Table I. After the diameter at the large end of the hole is obtained by the plug gage, the body length of the bolt and the overall length of the bolt are measured. Rough bolts of the proper size are then delivered to the bolt-turning lathe accompanied by a requisition such as shown in Table II which shows the number of bolts required, the letter designation of the plug gage used, the graduation of the plug gage, the body length of the bolt and the total length of the bolt under the head. The bolts are turned on turret lathes equipped with a taper-turning head, a bell pointer, and four automatic die heads for threading bolts of different sizes. A taper bar and taper mechanism which produce absolutely a taper of 1/16 in. in 12 in. are a part of the equipment.



Plug gage used for obtaining hole size

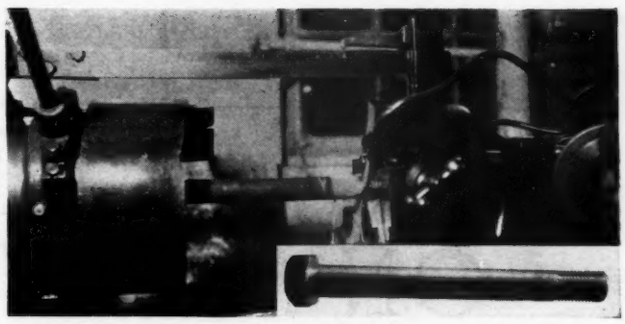
When the turret lathes were delivered to the shop it was the manufacturer's intention to have the operator take a roughing cut over the length of the bolt, measure the diameter under the head with a micrometer to determine its oversize, and then adjust the tool by dial setting to remove the necessary amount of stock to bring the bolt to the required size under the head. In other words, if the operator after taking a roughing cut found that the bolt was 0.010 in. oversize under the head, he adjusted the tool for the finish cut by setting the dial to 0.010 in. Although this method was an improvement over the making of tapered bolts on a small engine lathe, the supervision at West Albany was not satisfied with the production of the machine and, therefore, devised the method described in the following paragraphs for turning the bolts to finish size with one cut.

Assuming that only straight bolts of 2 in. diameter were to be turned on the turret lathes by unlocking the taper mechanism, it was observed that it would be a simple matter to make a plug gage of two diameters, the large end of which would fit exactly in the bore of the turning head and the small end of which, with a diameter of exactly 2 in., would extend past the cutting tool and rolls in this head. Such a plug was made and placed in the bore of the cutting head. Then, with the dial for adjusting the tool set at zero, the rolls and cutting tool were placed in contact with the 2-in. diameter extension of the gage. The tool and rolls were locked in this position and the gage removed. If a bolt were cut with the tool and rolls in this position and with the taper mechanism unlocked, the bolt would be straight throughout its entire length; it would have a diameter of exactly 2 in., and the finish size would be obtained with one cut. Furthermore, any diameter straight bolt within the limit of the head could then be machined to finish size in one cut by adjusting the dial for the required size. The next step was to adapt the plug method of setting the tool


The machine used for producing all the tapered bolts required for the freight-locomotive repairs

and rolls for turning tapered bolts. How this was done can best be exemplified by discussing all the factors involved in turning the bolts, remembering that the bolt-turning head is designed to cut either straight or tapered bolts and that the taper-cutting mechanism can be locked or unlocked by the movement of a lever.

Since the plug-gage system is used at the West Albany shops for obtaining the hole size, only the large diameter of the hole is obtained. This meant that some method had to be devised for adjusting the cutting tool and rolls to the small-end diameter of the bolt so that when the bolt was finished it would be the required size under the head. The next step was to determine the maximum length of bolt which had to be turned on the machine in order to limit the travel of the turret head to a minimum. For convenience in this article assume that the size bolt to be finished on the machines is 2 in. in diameter and has a body length of 12 in. with a taper of $\frac{1}{16}$ in. in the 12-in. length. With this taper, the diameter of the bolt at the small end will be $1\frac{15}{16}$ in. and, when the cutting tool is at this point, the indicating finger on the taper bar is at the 12-in. mark. A plug of two diameters is then made, the large end of which would fit exactly in the bar of the turning head and the small end of which, with a diameter of $1\frac{15}{16}$ in. plus 0.0025 in., would extend past the tool and rolls in this cutting head. The additional 0.0025 in. is added to the small-end diameter of the bolt so that the finish size under the head will be 0.0025 in. oversize for drive fit.



Turning a 2-in. by 12-in. tapered bolt to size in one cut—The finished bolt was completely machined in 1 min. 23 sec.

a bell pointer, and the tool in the cutting head is set with the adjusting dial at zero. The cutting head is brought into contact with the bolt and the feed is engaged. For a 2-in. length the bolt will be cut straight with a diameter of $1\frac{15}{16}$ in. plus 0.0025 in. When the indicating finger on the taper bar reaches the 12-in. mark the taper cut is started and the bolt from that point on will have a taper of $\frac{1}{16}$ in. in a foot so that the diameter under the head will be 2.0025 in.

After the tool and rollers in the cutting head are thus set, any other bolt with a diameter of 2 in. or less and with a body length of 12 in. or less can be turned. Assume that a $1\frac{3}{4}$-in. bolt, 12 in. long, is to be turned. The tool-adjusting dial, therefore, must be turned in 0.25 in. The bolt is placed in the chuck, pointed and the turret head indexed to its cutting position. The turret head is brought forward to contact the bolt and the feed is engaged. The thread end of the bolt will be turned straight to a diameter of $1\frac{11}{16}$ in. to a length determined by the number of nuts to be used. When the indicating finger on the taper bar reaches the 12-in. mark the taper feed becomes effective and the finish size of the bolt is turned in one cut, the diameter under the head at the end of the gage being $1\frac{3}{4}$ in. plus 0.0025 (1.7525 in.) under the head. Practice has proved that the taper at the end of short bolts can be disregarded when cutting threads.

One of the illustrations shows a bolt $1\frac{1}{4}$ in. in diameter and 12 in. long being turned; it also shows the finished bolt. This bolt was obtained from a rough-stock bin, set in the lathe, finished and removed from the lathe in 1 min. 23 sec. The outstanding feature of machining tapered bolts for locomotive repairs is the fact that only one turret lathe, shown in one of the illustrations, is used in the freight-locomotive erecting shop for turning all the bolts required. As previously stated, this lathe produces an average of 300 finished bolts every 8-hr. working day.

After the plug principle for adjusting and cutting tools and rolls was developed at the West Albany shops the manufacturer of the machine adopted the plugs as standard equipment and is furnishing it to all purchasers of the lathe.

Table I—Plug Gage Classification and Limits

Gage No.	Gage Limits A	B	C	D	E	F	G	H	I	J	K	L
10	1.1250	1.2500	1.3750	1.5000	1.6250	1.7500	1.8750	2.0000	2.1250	2.2500	2.3750	2.5000
9	1.1125	1.2375	1.3625	1.4875	1.6125	1.7375	1.8625	1.9875	2.1125	2.2375	2.3625	2.4875
8	1.1000	1.2250	1.3500	1.4750	1.6000	1.7250	1.8500	1.9750	2.1000	2.2250	2.3500	2.4750
7	1.0875	1.2125	1.3375	1.4625	1.5875	1.7125	1.8375	1.9625	2.0875	2.2125	2.3375	2.4625
6	1.0750	1.2000	1.3250	1.4500	1.5750	1.7000	1.8250	1.9500	2.0750	2.2000	2.3250	2.4500
5	1.0625	1.1875	1.3125	1.4375	1.5625	1.6875	1.8125	1.9375	2.0625	2.1875	2.3125	2.4375
4	1.0500	1.1750	1.3000	1.4250	1.5500	1.6750	1.8000	1.9250	2.0500	2.1750	2.3000	2.4250
3	1.0375	1.1625	1.2875	1.4125	1.5375	1.6625	1.7875	1.9125	2.0375	2.1625	2.2875	2.4125
2	1.0250	1.1500	1.2750	1.4000	1.5250	1.6500	1.7750	1.9000	2.0250	2.1500	2.2750	2.4000
1	1.0125	1.1375	1.2625	1.3875	1.5125	1.6375	1.7625	1.8875	2.0125	2.1375	2.2625	2.3875
0	1.0000	1.1250	1.2500	1.3750	1.1500	1.6250	1.7500	1.8750	2.0000	2.1250	2.2500	2.3750

The two-diameter plug is set in the cutting head and, with the tool-adjusting dial set at zero, the tool and rolls are brought in contact with the small end. The tool and rolls are then locked in this position and the plug gage is removed. The turret head is then moved forward until the indicating finger on the taper bar stops at the 12-in. mark. When the taper-turning mechanism is locked and when the turret head is located with the indicating finger on the taper bar set at the 12-in. mark, the machine is ready to turn a taper bolt 2.0025 in. in diameter under the head.

A rough bolt 14 in. long is chucked and pointed with

No. Bolts	Plug	Gage	Body Length, in.	Bolt Length, in.
1	C	7	$11\frac{1}{2}$	$13\frac{1}{2}$
3	D	$5\frac{1}{2}$	$3\frac{1}{2}$	6
3	D	$5\frac{1}{2}$	2	4
6	D	4	$4\frac{1}{2}$	$6\frac{1}{2}$
7	D	4	$1\frac{1}{2}$	$3\frac{1}{2}$
2	A	9	$1\frac{1}{2}$	$3\frac{1}{2}$
1	C	4	$1\frac{1}{2}$	$3\frac{1}{2}$
4	B	$4\frac{1}{2}$	$7\frac{1}{2}$	9

Name _____ Engine No. _____

Sample requisition of bolt order received by the machine operator

A VACATION ON NIGHTS . .

by Walt Wyre

"How's the 5080 coming?" John L. Starkey, general foreman for the S. P. & W. at Plainville, asked.

"Quite a bit of work yet," Jim Evans, the roundhouse foreman, replied. "Looks like we might have to work a couple of machinists and helpers overtime to finish it."

"Hell, no!" Starkey snapped. "Let's not work any overtime unless it's absolutely necessary. I've been burnt so much lately about overtime that my south end feels like a piece of toast before it's been scraped."

"Going to need her tonight," Evans reminded.

"Put all the men on her you can spare and leave her for the night men to finish," Starkey said.

"O.K.," Evans replied, "but the night foreman has got his hands full without us leaving him a lot of extra work."

"The night job's not bad, just inconvenient having to sleep days. The job itself is a pension. Of course, to hear Parker tell it, his shirt tail never has a chance to get acquainted with his back, but he's not kidding me. Why, he's only got about a dozen men on nights and they don't have much to do."

"Parker wants off next week. Why don't you go on the job while he's off?" Evans suggested. "It would give you a chance to rest up a bit." Starkey missed the tinge of sarcasm in Evans' tone.

"Well, if you don't mind taking care of the day job alone for a week, I might do it," Starkey replied.

Starkey stayed at home the afternoon that he was to go on nights.

Evans made a special effort to see that all work possible was done by the day force. Having handled the night job himself, he knew that it was no swivel chair job and that Starkey would have trouble enough, at best.

About 6:30 that evening Evans went to the roundhouse for a final look for the day. The foreman noticed a low-lying bank of clouds crouching against the horizon in the northwest as though waiting for darkness to spring. A purplish blue haze hung like a diaphanous curtain over the bank of clouds. Evans noticed, too, that the wind had shifted and the air was noticeably colder. "Looks like it might come a whizzer before morning," Evans commented to himself.

"How's everything going?" Starkey asked when he entered the roundhouse office a few minutes before seven.

"Oh, not so bad," Evans replied. "Everything's in fair shape. If that northwester hits, as it looks like it will, the despatcher will probably want to double-head the Limited; maybe No. 9, too. If he does, you'll be a

The northwester pounced with a roar. Starkey felt his hat leaving his head and made a grab. When he did, his fingers loosened on the work slips

Foot braced against the hand rail, Starkey opened the door of the dynamo and played the beam of his flashlight over the armature and brushes

little short of power. Everything's in the dope book," Evans added as he started to leave.

Starkey sat down at the desk to look over the lineup and read the dope book. The night roundhouse clerk didn't come on until eight.

"B-r-r-r!" The telephone sounded loud in the quiet office.

"Hello . . . Yes . . . When do you get out? . . . . . Wait until I look at the board."

It was a fireman wanting to know what time he was likely to get out. Starkey looked at the board, then picked up the telephone.

"You're four times out, but don't know just what time it'll be. Call later when the clerk's here," the foreman told the fireman and again started to read the lineup. He had finished the first two lines when the phone rang again.

"Hello . . . Yes, this is the roundhouse office. . . . No, Mrs. Jones, I can't say whether your husband will be in before eleven o'clock or not. Call back after eight o'clock. The clerk will be here then." Starkey slapped the receiver on the hook and picked up the dope book.

"I need two 7/8 hex nuts." The speaker was Morrison, a machinist, that started to work at six o'clock.

"Haven't they got any in the storeroom?"—then Starkey remembered there wouldn't be any one in the storeroom until eight o'clock. The night foreman carried the key and handled material from seven until eight in the evening and from five until seven in the morning.

Starkey searched in the desk drawer until he found the key. "Here, go get them and bring the key back," he told the machinist.

The phone rang three times more in the next ten minutes—an engineer wanted to lay off, the hoghead had probably noticed the clouds in the northwest; a fireman was going to the picture show, in case he was wanted; a fireman's wife wanted to leave word that she would be at a neighbor's if she wasn't at home when her husband called. Starkey became disgusted and took the receiver off the hook and left it off.

The foreman looked over the lineup, read the dope book, and went to the roundhouse. He had made the rounds and was starting back to the office when he met a messenger.

"The despatcher said tell you that your phone is not working and he wants a 2700 for a stock train east at 10:30," the messenger said.

"Tell him it'll be the— No, I'll call him back."

"But your telephone ain't working," the messenger said.

"Well—er—if we don't get it working, I'll send somebody to tell him," Starkey told the messenger.

The foreman rushed to the office and placed the receiver back on the hook. After checking over the engines that were O.K., he waited a few moments then called the dispatcher and gave him the 2714 for the stock train.

THE night clerk came in just as Starkey finished talking to the despatcher. The foreman glanced at his watch, five minutes until eight. "Great Scott!" he groaned, "the work slips were not even sorted." He grabbed the work reports and slips and rushed out of the office.

The northwester pounced with a roar. Starkey felt his hat leaving his head and made a grab. When he did, his fingers loosened on the work slips. A dozen or more of the yellow slips whisked away in the darkness. Starkey grabbed at the slips. His hat followed the slips. The foreman ran a few steps in pursuit and gave up. Paavo Nurmi himself couldn't have kept pace with the flying hat.

The bellow of the eight o'clock whistle blended with the howl of the wind. Starkey went back to the office holding fast to the crumpled work reports and remaining slips. "Wish you'd look these over and make new ones for the ones I lost," he told the clerk.

While the clerk was copying the reports on the work slips, Starkey found a cap and put on an additional jumper and started back to the roundhouse.

The night force were standing around the board waiting to go to work when the foreman got there. He assigned each of the five machinists to look an engine over and start working it. The boilermaker, he told to look over the engines that were marked up to run and do what was necessary to get them in condition to go. Boiler washers and cellar packers had already begun on their jobs. They knew from experience that it would keep them humping eight hours to get over the required number of engines.

When the men were all lined up and working, Starkey went back to the roundhouse office. The clerk had copied the work reports and had the slips ready to be distributed. That meant another trip to the roundhouse. Starkey picked up the yellow slips and again headed into the howling wind that had reached the proportions of a healthy young hurricane.

"Got to have a middle connection bushing for the

5088." Barnes, a machinist, hastily told the foreman.

"Well, go ahead and make it," the foreman replied.

"But—" The machinist didn't get a chance to finish. Starkey was already leaving.

The nut-splitter stood glaring at the foreman's back until Starkey disappeared around the front of the 2746 three stalls away. Then Barnes walked hesitatingly towards the machine shop.

Starkey distributed the slips hoping he had given the various mechanics jobs they could do best and started back to the office. The foreman didn't get far before a machinist stopped him. The machinist was holding a copper pipe in his hand.

"Have to have a collar brazed on this pipe."

"Give it to a coppersmith," Starkey replied and started to walk on.

"Ain't no coppersmith on nights," the machinist replied.

"Guess you'll have to braze it yourself then," Starkey said.

"I'll try it if you say to, but—"

"Go ahead and braze it," the foreman told him and went on to the office.

"Despatcher wants to know if he can count on getting the engine for the stock extra at 9:40 and he wants another one at 10:15. He wants a 5000 this time," the clerk said.

The foreman hesitated a moment, then said, "Tell him it'll be the 5088. Guess I'd better go see if the firebuilder has got a fire in her yet. Ought to have roller skates on this job," he remarked as he reached for the door knob.

The fire-builder had a fire going in the 5088 and the hand on the steam gauge had already left the peg. The middle connection bushing was yet to be replaced, the foreman remembered, but machinist Barnes was working on that.

He climbed down from the cab and started to go to the machine shop to see how Barnes was getting along with the bushing when the second trick inspector came rushing up as though he had just discovered a fire and was on his way to give the alarm.

"No lights on the 2714!" the inspector panted.

"Where is she?" the foreman asked.

"Outside," the inspector replied. "The hostler is taking her around."

"Well, get the—" Starkey started to say get the electrician, then remembered there was no electrician on nights. "Who does the headlight work at night?"

"Oh, first one then the other. If it's much of a job, Parker calls the electrician. He usually does the little jobs himself."

"Well," Starkey said resignedly, "I'll go look at it. You got any tools with you?"

"Pair of pliers and a hammer," the inspector said.

Although it was only a few minutes after nine o'clock, Starkey's legs groaned in protest as he and the inspector hurried toward the 2714.

In the meantime, the northwester had quit fooling and gone to work in earnest. A blast of sand mixed with snow and sleet rode the icy wind.

"Blowing pretty hard?" Starkey yelled as he wiped the tears from his smarting sand-filled eyes.

"Ugh-huh," the inspector replied, keeping his mouth closed against the sand.

By the time the pair had reached the 2714, Starkey was pretty well played out. The foreman climbed up in the cab and sat down on the fireman's seat box to get his breath and wipe some of the sand from his eyes.

"O.K.," the hostler helper yelled from the top of the oil tank where he was filling the tank with fuel oil.

"How much time we got?" Starkey asked the hostler.

"'Bout forty minutes," the hostler replied as he released the air and eased the throttle open a few notches. "Got to take water, then I'll set her out on the lead."

"I'll take a look at the dynamo while you're taking water," Starkey told the hostler when the engine was spotted at the water crane.

Starkey, flashlight in hand, climbed out on top of the locomotive. The wind howled a protest and showered the foreman with a stinging blast of sand.

Foot braced against the hand rail, Starkey opened the door of the dynamo and played the beam of his flashlight over the armature and brushes. The brushes were still there and the armature was turning. The dynamo looked O.K., but the lights wouldn't burn.

"Look out—I'm going to move her," the hostler yelled and gave two short toots of the whistle.

"Go ahead," the foreman yelled back and braced himself more firmly.

"Whoosh!" the exhaust gurled as the engine vomited a slug of water from the stack. It wasn't Saturday night, but Starkey got a bath. The wind was blowing in just the right direction to hurl the spray of water toward the foreman. "Hey!" he yelled.

The hostler stopped the engine but not before another deluge of water from the stack had finished wetting the foreman's back. He climbed down in the cab and backed up to the fire-door.

"What's the idea, filling the boiler so full of water it spouts like Old Faithful?" Starkey asked the hostler.

"I'll blow her off some," the hostler was trying hard to keep from laughing, "and I always leave it fairly well filled," the hostler added as he released the air.

When the engine had stopped on the lead to wait for the crew, the foreman again climbed out on the boiler. In three minutes he was cold as a bottle of frozen beer. A film of ice was beginning to form on his overall jumper and he had made no progress in locating what ailed the recalcitrant dynamo.

He was about ready to give it up when the clerk came out in search of the foreman. The clerk yelled at the top of his voice but couldn't make himself heard above the roar of the wind. Starkey climbed stiffly down to see what the clerk wanted.

"Despatcher wants to double-head the Special and No. 9, and he said be sure the engine was ready for the second stock train."

"G-go c-call the electrician, t-tell him to h-h-hurry." The foreman's teeth were chattering. When in the office, he peeled off the wet jumper and found a dry one. He put his overcoat on over the jumper and urged himself towards the roundhouse.

Starkey stopped at the 5088. The middle connection bushing had not been renewed and the machinist doing the job was not in sight.

"Where's Barnes?" the foreman asked the cellar packer.

"Out in the machine shop, I think," the cellar packer replied.

Starkey headed for the machine shop. The machinist was taking a cut on a brass. At least that seemed his intensions. The lathe tool evidently had other ideas from the way it was acting.

"What's the matter, Barnes? Haven't you finished that bushing yet?"

"Er-ah-I made one and got it too big on the inside. This brass is full of sand spots and I'm having trouble with the tool," the machinist replied.

"My God, man, it oughtn't to take two hours to make a bushing!"

The machinist flushed a dull red. "Well, you see, I took a lot of time finding lathe tools. I haven't got any myself," the machinist explained. "And it's been several years since I did any lathe work."

"Who does the machine work nights?" Starkey asked.

"Holmes does most of it. He's got the tools."

"Well, where in the hell is Holmes?" the foreman exploded.

"Last time I saw him he was trying to braze a collar on a copper pipe and having a dickens of a time doing it, too. I most generally do the cab work and brazing," he added.

"Why in the hell didn't you tell me! Find Holmes and tell him to make the bushing and hurry!"

Starkey on his way through the roundhouse saw Holmes before Barnes did. Holmes had the same piece of copper pipe in his hand that he was carrying when the foreman had first told the machinist to braze it himself.

"Well, I'll be damned!" the foreman exploded when he saw the job of brazing on the pipe. "Have you been working on that all this time?"

"Yeah, I ain't much of a coppersmith," Holmes growled.

"Well, beat it to the machine shop and see what you can do with that bushing that Barnes has been working on. Let him finish the pipe." The foreman went on down through the house.

Near the board he met the night boilermaker. "Washout plug leaking in the 5071," the boilermaker said.

Starkey looked at his watch. "And she's called for the Limited. Can't you tighten the plug so it won't leak?" It was more of a plea than a question.

"Not a chance. I tried it," the boilermaker said.

"Let's look at it," the foreman said, in the tone he might have used when speaking of looking at the corpse of a close friend that had died suddenly.

The plug was leaking, and it was tight—no argument on either point. While they were examining the plug, the hostler came in to take the engine out.

"Ready to go?" the hostler inquired.

"Not quite," Starkey replied. Then to the boilermaker he said, "Get a chisel and calk the plug. I know it's bad business, but it's that or delay the Limited. I'll take the chance."

When quitting time came, Starkey was too tired even to notice that the wind had stopped blowing. He walked as though he was wearing lead soled shoes like divers wear and his back end dragging out his tracks. He barely exchanged greetings with Evans when the day foreman showed up.

Starkey still showed the effects of his strenuous night when he returned to work that evening. A red hot wire from the master mechanic asking for explanations as to why a wash out plug had been calked and same found by a government inspector. That day didn't add to the gayety of the occasion. Starkey was mentally and physically tired but not whipped. When Evans, noticing the tired lines on Starkey's face, offered to work a couple more hours, Starkey refused the offer.

The next six nights were not as bad as the first one had been, but they were bad enough. Starkey was busy all night every night of the week. Instead of the vacation he had mentioned, he did seven nights of the hardest work he had done in many months. He had never dreamed that the night foreman had so many problems with which to contend and so much work for the number of men on the night shift.

"Well, how'd you like it on nights?" Evans asked when the general foreman was back on days.

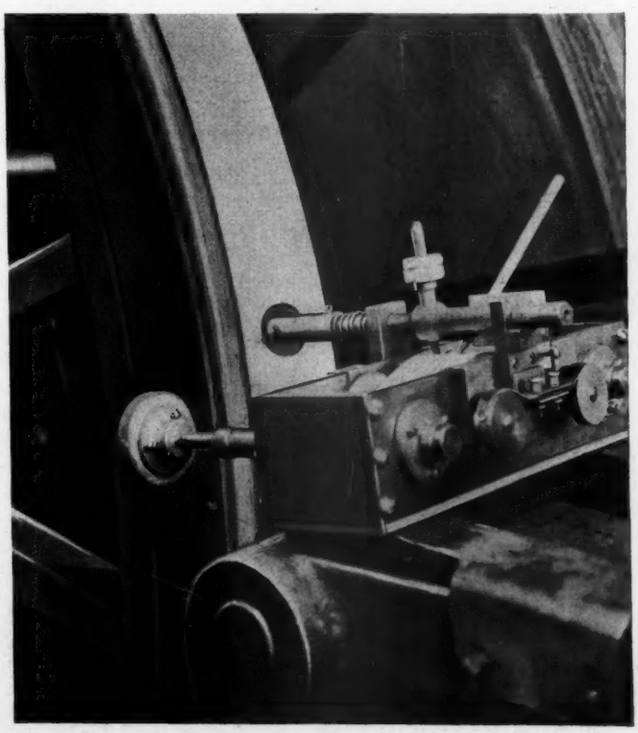
"Oh, it's not so bad after a fellow gets used to it. But I do think we need a coppersmith and an electrician and maybe another machinist and helper on nights," Starkey admitted. "More work on nights than I thought," he added.

Device for Recording Eccentricity of Wheels

A simple and effective device for producing a permanent record of the rotundity of driving wheel tires has been developed at the locomotive repair shop of the New York, Ontario & Western at Middletown, N. Y. The construction and method of using this recorder is clearly shown in the two accompanying illustrations, one of which shows the interior construction and the other the method of applying it to the tool post of the tire turning lathe.

The recorder consists of two gear-driven drums which carry a paper tape about two inches wide. The movement of the tape is effected by means of a roller, on an extended shaft, which bears against the inside of the driver tire. The tape is kept taut by means of a spring-steel brake acting on two small drums on shaft extensions at the rear of the casing.

The record on the tape is made by two pencils. One of these is fixed in a holder which is attached to the recorder casing and, as the tape moves, it draws a straight base line. This pencil is the one shown at an angle in the illustrations. The other pencil is the one which produces the record of the tire contour. This pencil is mounted vertically in a rod which moves toward or away from

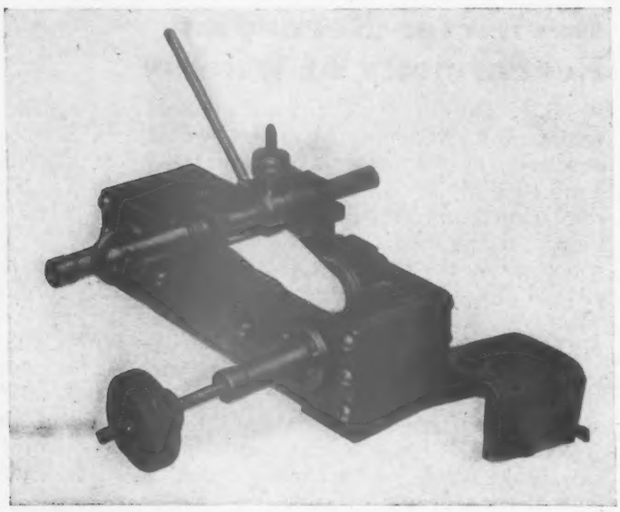


The indicator in position on a driving-wheel-lathe tool post—The movable roller and pencil produce the record of rotundity

the wheel center as the wheel turns in the lathe. A roller, in the end of this rod, bears against the tread and a coil spring, clearly shown back of the roller, holds it against the tire tread.

The completed record consists of two pencil lines on

the tape. One is a base line and the other, made by the pencil in the moving rod, indicates whether or not the tire is out of round, where, and how much. A perfectly circular tire tread, concentric with the axle would produe two straight lines on the tape. The distance that the lines would be apart would depend on the setting of



The roller in the foreground drives the recorder tape drums through gears—The indicator may be used on either right or left-hand tool post

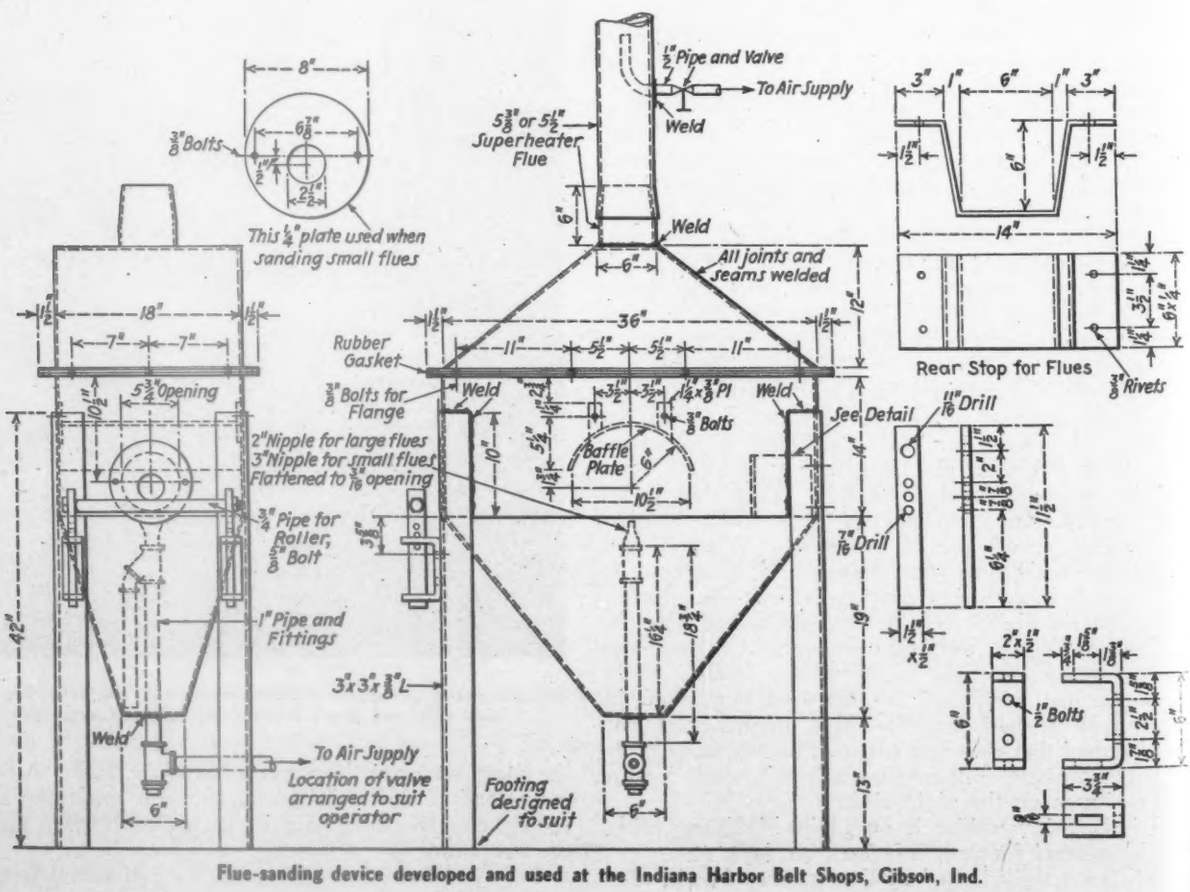
the recorder on the tool post. If, for example, it was set so that the lines were normally ¼ in. apart and the recording pencil made a line 5/16 in. away from the base line at some point on the circumference of the tire, that would indicate that the tire was 1/16 in. out of round at that particular location.

Flue-Sanding Device

The flue-sanding device, shown on the drawing, has been developed and successfully used at the Indiana Harbor Belt shops, Gibson, Ind., effecting a saving of 50 per cent and more in cost over the old method of grinding the exterior surface of flue ends so that they will make a good contact in the copper jaws of the electric butt-welding machine. The old grinding price was 1.5 cents per flue end which may be compared with 0.75 cents per flue end with the new sanding method. In the case of safe ends, a still greater saving is effected, the old price being 1.2 cents per safe end and the new price 0.4 cents per safe end. Average saving per locomotive is $3.56.

Experience shows that the average amount of sand needed to clean 100 flues and safe ends is 144 lb. The average cost of this sand, which includes handling and drying, is 22 cents per 100 lb. Strictly speaking the cost of the sand is less than this because, to a large extent, it consists of sand taken from the sand domes of locomotives due for shopping, which might otherwise be wasted. Also this sand is used over and over again.

Both the general arrangement and important details of this efficient flue-sanding device are clearly shown in the drawing. The main sand-box housing, made of sheet steel, 36 in. long by 18 in. wide by 40 in. high, is mounted 32 in. above the shop floor on four 3-in. angle iron legs applied to the corners of the box by welding. A taper hopper, welded to the bottom of this sand box serves for sand storage and to collect the heavier particles of sand which fall after striking the flue surface. The bottom of this hopper consists of a 6-in. square plate through which the 1-in. air line pipe passes to the sand nozzle and syphon connection. Above the sand



Flue-sanding device developed and used at the Indiana Harbor Belt Shops, Gibson, Ind.

box is a tapered hood which serves to collect fine dust particles in the air and conduct them into the exhaust pipe, made of a scrap superheater flue, which passes straight up through the shop roof.

The draft in this exhaust flue may be regulated as required by means of compressed air supplied through a ½-in. pipe which passes through the flue and is bent upward as shown in the drawing. While the entire structure of the flue sander is generally formed by welding, the dust-collecting hood is removable for purposes of inspection and repair of interior parts by simply taking out a few ⅜-in. bolts through the flanges. A rubber gasket is used to make this joint air-tight during operation of the sanding. Referring to the drawing, it will be noted that a circular baffle plate is located immediately above the flue position so that sand and air will not be blown directly out of the stack but be deflected downward and give a chance for the heavier particles of sand to drop back into the hopper.

The detail construction of the sand nozzle is clearly shown. Air at shop pressure is brought into this machine through the 6-in. square bottom hopper plate and passes through a vertical section of 1 in. pipe to a special nozzle which consists of a 1-in. nipple flattened to a 3/16-in opening. This nipple is 2 in. long for large flues and 3 in. long for small flues. A Y-fitting with suitable pipe connection to the bottom of the hopper furnishes a supply of sand under syphon action, this sand being drawn into the air stream and forced at high velocity through the nozzle against the boiler flue. For durability the tip of the nozzle is coated with Stellite.

In operation, the flue end is pushed into this sanding machine through a close-fitting hole in the front of the sander and rotated as the end is gradually pushed through the sand stream until it hits a rear stop, suitably located. For small flues, a special circular plate with a 2½-in. center hole, as shown, is used. The weight of the flue is supported on a ¾-in. roller pipe, easily adjustable for height, as illustrated. Short safe ends are sanded by placing them, one at a time on a scrap flue which has been swedged down at one end and equipped with steel spring strips lightly welded to the swedged end and arranged to grip the safe end when it is slipped over them. The safe end, as thus applied on the end of the scrap flue is then sanded just like any long flue.

Carboloy Tool Kit

A Carboloy tool kit for general machining operations has been developed by Carboloy Company, Inc., Detroit, Mich. The kit contains nine Carboloy milled and brazed tools, a 20-page booklet dealing with rapid grinding technique, and a 12-page booklet showing more than 50 suggested applications for the nine Carboloy tools. The kit is adapted for shops where the limited production of any one type of part does not, in many instances, warrant the purchase of single-purpose carbide tools. To meet the requirements of such shops, the nine Carboloy tools in the kit are designed for general turning, facing and boring operations on engine lathes, turret lathes, boring mills and boring bars.

Of particular interest is the fact that the Carboloy tools in this kit are being furnished to the user in the so-called "milled and brazed" state. This carbide tool terminology means that all operations have been completed except the grinding. This is done by the user in his own plant using the technique described in detail in the grinding manual

Carboloy tool kit for limit production jobs

enclosed with each kit. By this method, the user obtains the tools in the Carboloy kit at a saving of approximately 36 per cent in investment cost over the cost of these same tools in the finished ground state. However, a certain percentage of this saving is absorbed by the user when grinding the tools for use in his plant.

Universal Electric Grinder

The illustration shows an electric grinder which has been added to the products manufactured by the Chicago Pneumatic Tool Company, 6 East Forty-fourth street, New York. Although the tool is for general purpose grinding it can, with the proper wheel adjustment, be used for wire brushing, buffing, and polishing of all types of metal surfaces. The motor is totally enclosed and fan-cooled to eliminate dust troubles and over-heating. The motor is enclosed in a copper shield which conducts the motor heat to the cooling area. The fan forces a current of air over this shield and out over the gear case onto work.

The grinder is made in two sizes, one with a 5-in. by ¾-in. wheel and the other with a 6-in. by 1-in. wheel. The former weighs 13¾ lb. has an overall length of 23¾ in., operates free at 4,500 r.p.m. and loaded at 2,700 r.p.m. The 6-in. by 1-in. grinder weighs 22 lb., and has an overall length of 24 in. It operates at 3,900 r.p.m. when free and 2,600 r.p.m. when loaded. The work ends of the spindles of both grinders are equipped with two rows of ball bearings to take all radial and thrust loads.

Chicago Pneumatic electric grinder

The Ajax 1½-in. bolt heading and upsetting forging machine

Bolt Heading and Upsetting Forging Machine

The Ajax Manufacturing Company, Cleveland, Ohio, recently announced that its latest design of bolt heading and upsetting forging machine is being built in sizes rated at 1 in. and 1½ in. capacity and is being equipped with the patented Ajax air clutch, which has proved successful on larger machines. The 1 in. and 1½ in. machines occupy less floor space than earlier models, and give a higher production on a wide variety of intricate upset forgings, as well as a complete range of nuts, bolts and rivets.

Because of the capacity and speed of the machines, the flywheel is mounted on the crankshaft, and delivers ample power to drive the machine. The motor is direct connected to the flywheel, either through a fiber pinion on the motor shaft, which meshes with an integral gear on the flywheel rim, or through multiple V belts. It is mounted on a bracket above the crankshaft housing where it requires no additional floor space.

Instantaneous treadle response of the air clutch has increased production, decreased fatigue of the operator, and makes possible the completion in a single heat of forgings which formerly required a reheat after preliminary upsetting. When the foot pedal at the operator's position is depressed, it releases the band brake, and at the same time opens the air valve to the clucth. This introduces compressed air behind an air piston, carried by the flywheel, and applies pressure directly to the friction plates, clamping them together and starting the machine. At a predetermined point in the operating cycle, the air is cut off, disengaging the clutch. A cam on the rim of the brake drum then set the brakes, which stops the machine accurately on open stroke.

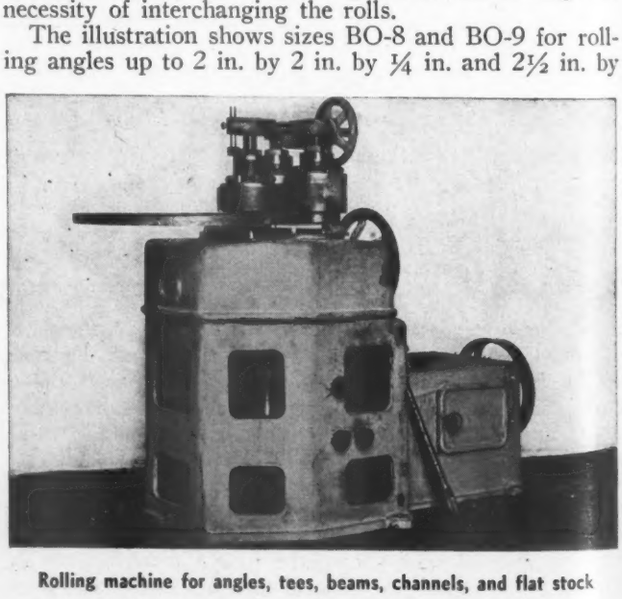
The bed frame is a one-piece open-hearth steel casting with deep vertical and heavy horizontal ribbing to withstand the tremendous heading and gripping pressures. Integral bearing housings bridged with a heavy horizontal crown rib support the forged alloy crankshaft which rotates in solid sleeve-type bearings. The header slide, which is top suspended from long wide lips, is held in alinement by an extension guide bearing supported at a neutral position in the frame. An intermediate under-arm holds the main slide body and the extended guide bearing in line, and prevents deflection under heavy loads. Due to the use of this patented slide construction—exclusive in Ajax machines—the entire pitman assembly is accessible for inspection or adjustment. The right-hand side liner of the header slide is screw plug adjusted to compensate for out-of-parallel wear unavoidably developed after long periods of service.

A fully automatic safety mechanism protects the machine from damage due to oversized or misplaced stock which would prevent the dies from closing. It immediately resets itself so that production is not interrupted by a shut-down which would necessitate removing the heated stock from the furnace. An adjustable double-plunger pump, built into an oil reservoir at the back of the machine, is driven off the crankshaft by a rachet arm. The pump delivers the lubricant at a predetermined rate into the two distributors or headers, where it is proportioned into pipes that carry it to the oil pocket at each bearing.

Schatz-Herkules Bending Rolls

The "Schatz-Herkules" machines for rolling angles, tees, beams, channels, and flats are being introduced by the Schatz Manufacturing Co., Poughkeepsie, N. Y. These units are available in various sizes for bending angles from smallest sizes up to 8 in. by 8 in. by 1 in. The feature of the machine is the roll adjustment which permits the rolling of different profiles, eliminating the necessity of interchanging the rolls.

The illustration shows sizes BO-8 and BO-9 for rolling angles up to 2 in. by 2 in. by ¼ in. and 2½ in. by



Rolling machine for angles, tees, beams, channels, and flat stock

2½ in. by 5/16 in., respectively. Horizontal operation permits the handling of the longest bars and largest rings. The guide rolls have both vertical and radial adjustment, which, together with the roll design, can produce rings or arcs absolutely true and round without twisting the material. The machines can be obtained for either unit electric drive or belt drive.

Among the Clubs and Associations

TORONTO RAILWAY CLUB.—"What Must the Railways Provide?" will be the subject of an address by L. K. Sillcox, first vice-president of the New York Air Brake Company, before the meeting of the Toronto Railway Club to be held on May 17 at Toronto. A musical program will follow the address.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—F. S. Thompson, chief engineer, General American Transportation Corporation, Chicago, is to discuss Tank Cars—Their Design and Services at the meeting of the Car Foremen's Association of Chicago to be held at 8 p.m. daylight saving time on May 10 at the LaSalle Hotel, Chicago.

NEW YORK RAILROAD CLUB.—The New York Railroad Club at its meeting on Friday evening, May 21, will observe United States Steel Night. C. A. Gill, general manager of the Reading, and president of the club, will make the opening remarks, after which J. R. Mills, manager of sales, Carnegie-Illinois Steel Corporation, will act as master of ceremonies. An address on Research Developments in Steel for Railroad Equipment will be made by A. F. Stuebing, railroad mechanical engineer of the United States Steel Corporation. This will be followed by an address on Rail—Recent Tests and Developments, by F. R. Layng, chief engineer of the Bessemer & Lake Erie. Motion picture films will be shown of the manufacture and treatment of rail and the laying of one mile of experimental welded track on the Bessemer & Lake Erie. The technical program will be followed by several entertainment features.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION.—Important matters of public policy were given unusual prominence at the thirty-fifth spring convention of the National Machine Tool Builders' Association held at the Edgewater Beach hotel, Chicago, May 3-4. In an address showing the vital relation of machine tools to American prosperity, President Clayton R. Burt, President Pratt & Whitney division, Niles-Bement-Pond Company, Hartford, Conn., said that machine tool builders are committed to the principle of "more goods for more people" as a means of creating full employment for all who honestly want to work. He said that machine tool builders have a reputation for fair dealing with employees, with whom they have shared the profits of the industry; that they have co-operated with customers to increase production, thus making possible higher wages and increased distribution of products; that they have never ceased to furnish equipment essential for national defense needs, even though this has meant meeting the higher cost of the Walsh-Healey requirements; that they have contributed heavily to the support of various communities through taxes and service expenditures; and that they have led the procession in establishing sound training courses for young men to supplement school work in well-equipped trade and technical schools and co-operative colleges. ¶Mr. Burt said that machine tool builders are bending their effort to design and supply the master tools which are the foundation for all better living and closed his address with the following comment: "The whole-hearted co-operation of every branch and department of industry to improve quality and lower costs through technical means, in the interest of lower prices and greater employment income, is a project worthy of every encouragement from Washington. It merits freedom from crippling restrictions, fearless reduction of unnecessary government costs and a sincere effort to administer the laws now enacted with fairness to both the management of all business enterprises and to their employees." ¶Following the president's address Tell Berna, general manager of the association, told what the members of the industry are doing and, in the interest of an enlightened public policy, urged the association to continue to place interesting and intimate facts concerning its activities before the public and those in charge of our national affairs. Dr. James S. Thomas, president Clarkson College of Technology, Potsdam, N. Y., addressed the association on "What Machinery Has Done to Mankind" and W. J. Cameron, Ford Motor Company, presented the subject, "Industry and Society." Other subjects of specialized interest were discussed by nationally known speakers.

AIR BRAKE ASSN.—The association will hold a meeting at Atlantic City on June 17 and 18, in order to take advantage of the elaborate exhibit which will be held in connection with the meetings of the Mechanical Division and the Purchases and Stores Division of the Association of American Railroads. The headquarters of the Air Brake Asociation will be at the Haddon Hall Hotel. While the program has not yet been completed, plans are now being made to discuss the new standard "AB" freight car brake; the new H.S.C. passenger brake; the No. 8-ET equipment; inspection and maintenance of brake beam hangers and attachments; F-1 lubricator for steam driven air compressors; and the "AB" empty and load brake equipment.

* * *

Courtesy S. F. Call-Bulletin

"Hmm! Rods streamlined, too!"

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Plans for the 1937 semi-annual meeting of the American Society of Mechanical Engineers, to be held at the Hotel Statler, Detroit, Mich., May 17 to 21, inclusive, include a series of six general sessions, mornings and evenings, with plant visits and simultaneous sessions of the various professional divisions on the afternoons of the same days. The general sessions will conclude with a dinner on Thursday evening, May 20, during which honorary membership will be bestowed upon Alex Dow, a past Society president. ¶Among the papers of particular interest to be presented at the spring meeting are:

TUESDAY MORNING, MAY 18

Modern Locomotive and Axle Testing Equipment, by T. V. Buckwalter, vice-president; W. C. Sanders, general manager, Railway Division, and O. J. Horger, research engineer, Timken Roller Bearing Co., Canton, Ohio.

WEDNESDAY MORNING, MAY 19

The Aspects of Automotive Engineering Which Have Been Applicable to Railroading, by Edward G. Budd, president, Edward G. Budd Manufacturing Company, Philadelphia, Pa.

The Economics of Power for Light-Weight Trains, by Dr. Rupen Eksergian, Edward G. Budd Manufacturing Company, Philadelphia, Pa.

WEDNESDAY AFTERNOON, MAY 19

(Welding Session Co-sponsored by American Welding Society)

Welded Steel in High-Speed Railway Service, by Everett Chapman, president, Lukenweld, Inc., Coatesville, Pa.

Hydromatic Welding of Frames, by C. L. Eksergian, chief engineer, Budd Wheel Co., Philadelphia, Pa.

THURSDAY AFTERNOON, MAY 20

High-Speed Diesel-Engine-Maintenance Practice on the Canadian National Railways, by I. I. Sylvester, special engineer, Canadian National Railways, Montreal.

New Urban Transportation Equipment and New Steam Railroad Equipment, by H. L. Andrews, General Electric Company.

The Grinding of Cemented Carbide Milling Cutters, by Hans Ernst, research engineer, and M. Kronenberg, Cincinnati Milling Machine Co., Cincinnati, Ohio.

Report of Subcommittee on Metal Cutting Data on Reducing Production Costs by More Effective Use of Metal-Cutting Tools, by R. C. Deale.

FRIDAY MORNING, MAY 21

Railroad Streamlining, by A. I. Lipetz, chief consulting engineer, American Locomotive Company, Schenectady, N. Y.

Light-Weight Passenger Train Resistance, by A. I. Lotten, Transportation Engineering Department, General Electric Company.

WESTERN RAILWAY CLUB.—A meeting devoted to railway purchasing and storekeeping was held by the Western Railway Club in Chicago on April 19. Over 200 members and guests of the club gathered

in the Sherman Hotel to hear an address by G. O. Beale, chief purchases and stores officer of the Chesapeake & Ohio, Pere Marquette and New York, Chicago & St. Louis. Mr. Beale was unavoidably prevented from attending the meeting in person and his paper, "The Modern Purchasing and Stores Department," was presented by R. M. Nelson, purchasing agent, Chesapeake & Ohio. Mr. Nelson paid a tribute to H. C. Pearce, former director of purchases and stores of the Chesapeake & Ohio, for his contributions to advancement of efficient storekeeping and was joined in the tribute by the president of the club, D. C. Curtis, following Mr. Pearce's response. Out of town guests included E. M. Willis, purchasing agent, Northern Pacific; W. R. Culver, general storekeeper, Chesapeake & Ohio; J. T. Kelly, general storekeeper, C. M. St. P. & P., and W. J. Farrell, secretary, purchases and stores division, A. A. R. Other purchasing and stores officers in attendance included E. A. Clifford, general purchasing agent, Chicago & North Western; R. D. Long, purchasing agent, Chicago, Burlington & Quincy; L. L. King, purchasing agent, Illinois Central; L. J. Ahlering, purchasing agent, C. & E. I.; C. H. Kenzel, purchasing agent, E. J. & E.; C. W. Yeaman, purchasing agent, C. & W. I.; and W. S. Morehead, general storekeeper, Ill. Cen.

Freight-Car Maintenance

Car Foremen's Association of Chicago.—At the regular monthly meeting held April 12 at the Hotel LaSalle, Chicago, the principal address was made by K. F. Nystrom, superintendent car department, C. M. St. P. & P., who discussed the subject "Freight Car Maintenance." Mr. Nystrom said, in effect, that the maintenance of freight equipment begins with a comprehensive understanding of car-service requirements and ends at the dismantling plant where the equipment is finally cut up for scrap. He stressed the importance of car design by railway officers experienced in car use, as well as details of technical design and urged that individual car foremen be given an unhampered opportunity to express their opinions, both favorable and otherwise, regarding proposed new features of design. ¶Mr. Nystrom explained how to make the financial analysis necessary in determining whether it is more economical to repair car equipment or purchase new, and gave a general description of Milwaukee practice in making schedule repairs to freight cars on a four-year cycle basis, also in handling annual work at ten system points.

Machine Tools as a National Asset

A.S.M.E., Chicago Section.—At the machine shop practice spring meeting of the Chicago Section, the principal address, "Machine Tools as a National Asset," was made by Raymond S. Perry, vice-president, Ingersoll Milling Machine Company, Rockford, Ill. Mr. Perry presented a general discussion of this subject and, in refuting the argument that machinery is responsible for unemployment and to a certain extent for the present depression, he quoted the National Industrial Conference report as saying that no evidence is available to show that machinery is a real factor in unemployment, either during normal or depression periods. Mr. Perry said that his company looks on machinery as an investment of money to make money and that only a very small percentage of machine-tool purchasers have any well-defined method of determining the real value of machinery or deciding when it is economical to retire and replace existing equipment. ¶In this connection, the fact was developed that 60 per cent of the machine-tool buyers who have a definite plan of replacing machine tools purchase new equipment when the estimated direct labor savings in a specific period of time will equal the investment cost. In the case of some automobile manufacturers this period is as short as 144 days. With other manufacturers it is 6 months and with still others, including the railroads, possibly 3 to 5 years.

Mr. Perry emphasized the necessity of looking at machinery, not from the standpoint of age alone but serviceability as well, since it is by no means impossible to find a 30-year-old machine which, for a certain operation under special conditions, is doing very good work and cannot be economically replaced. Mr. Perry said he does not believe that any hard and fast formula can be developed for the purchase of machinery which will be generally applicable in all circumstances, but that all of the numerous factors must be studied individually in the light of special conditions under which each tool will be used.

DIRECTORY

The following list gives names of secretaries, dates of next regular meetings, and places of meetings of mechanical associations and railroad clubs:

AIR-BRAKE ASSOCIATION.—T. L. Burton, care of Westinghouse Air Brake Company, 3400 Empire State Building, New York.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, 11402 Calumet avenue, Chicago.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—C. E. Davies, 29 West Thirty-ninth street, New York. Semi-annual meeting, May 17-21.

RAILROAD DIVISION.—Marion B. Richardson, 21 Hazel avenue, Livingston, N. J.

MACHINE SHOP PRACTICE DIVISION.—J. R. Weaver, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

MATERIALS HANDLING DIVISION.—F. J. Shepard, Jr., Lewis-Shepard Co., Watertown Station, Boston, Mass.

OIL AND GAS POWER DIVISION.—M. J. Reed, 2 West Forty-fifth street, New York.

FUELS DIVISION.—W. G. Christy, Department of Health Regulation, Court House, Jersey City, N. J.

ASSOCIATION OF AMERICAN RAILROADS.—J. M. Symes, vice-president operations and maintenance department, Transportation Building, Washington, D. C.

DIVISION I.—OPERATING.—SAFETY SECTION.—J. C. Caviston, 30 Vesey street, New York.

DIVISION V.—MECHANICAL.—V. R. Hawthorne, 59 East Van Buren street, Chicago. 1937 convention, June 16-23, Atlantic City, N. J.

COMMITTEE ON RESEARCH.—E. B. Hall, chairman, care of Chicago & North Western, Chicago.

DIVISION VI.—PURCHASES AND STORES.—W. J. Farrell, 30 Vesey street, New York. Annual meeting, June 21, 22 and 23, Atlantic City, N. J.

DIVISION VIII.—MOTOR TRANSPORT.—CAR SERVICE DIVISION.—George M. Campbell, Transportation Building, Washington, D. C.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., 1519 Daily News Building, 400 West Madison street, Chicago, Ill.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2271 Wilson avenue, Montreal, Que. Regular meetings, second Monday of each month, except in June, July and August, at Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS' ASSOCIATION.—A. S. Sternberg, master car builder, Belt Railway of Chicago, 7926 South Morgan street, Chicago.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 2514 West Fifty-fifth street, Chicago. Regular meetings, second Monday in each month, except June, July and August, La Salle Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF OMAHA, COUNCIL BLUFFS AND SOUTH OMAHA INTERCHANGE.—H. E. Moran, Chicago Great Western, Council Bluffs, Ia. Regular meetings, second Thursday of each month at 1:15 p. m.

CENTRAL RAILWAY CLUB OF BUFFALO.—Mrs. M. D. Reed, Room 1817, Hotel Statler, Buffalo, N. Y. Regular meetings, second Thursday each month, except June, July and August, at Hotel Statler, Buffalo.

EASTERN CAR FOREMEN'S ASSOCIATION.—E. L. Brown, care of the Baltimore & Ohio, St. George, Staten Island, N. Y. Regular meetings, fourth Friday of each month, except June, July, August and September.

INDIANAPOLIS CAR INSPECTION ASSOCIATION.—R. A. Singleton, 822 Big Four Building, Indianapolis, Ind. Regular meetings, first Monday of each month, except July, August and September, at Hotel Severin, Indianapolis, at 7 p. m.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—See Railway Fuel and Traveling Engineers' Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—William Hall, 1061 West Wabasha street, Winona, Minn. Next meeting, September 28 and 29, Hotel Sherman, Chicago, Ill.

INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central, 2347 Clark avenue, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—A. F. Stiglmeier, secretary, 29 Parkwood street, Albany, N. Y. Annual meeting, September 29 and 30, Hotel Sherman, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic avenue, Boston, Mass. Regular meetings, second Tuesday in each month, except June, July, August and September, at Hotel Touraine, Boston.

NEW YORK RAILROAD CLUB.—D. W. Pye, Room 527, 30 Church street, New York. Meetings, third Friday in each month, except June, July, August and September, at 29 West Thirty-ninth street, New York.

NORTHWEST CAR MEN'S ASSOCIATION.—E. N. Myers, chief interchange inspector, Minnesota Transfer Railway, St. Paul, Minn. Meetings, first Monday each month, except June, July and August, at Midway Club rooms, University and Prior avenue, St. Paul.

PACIFIC RAILWAY CLUB.—William S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month in San Francisco and Oakland, Calif., alternately—June in Los Angeles and October in Sacramento.

RAILWAY CLUB OF GREENVILLE.—J. Howard Waite, 43 Chambers avenue, Greenville, Pa. Regular meetings, third Thursday in month, except June, July and August.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1941 Oliver Building, Pittsburgh, Pa. Regular meetings, fourth Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY FIRE PROTECTION ASSOCIATION.—P. A. Bissell, 40 Broad street, Boston, Mass. Annual meeting, October 19-20, 1937.

RAILWAY FUEL AND TRAVELING ENGINEERS' ASSOCIATION.—T. Duff Smith, 1255 Old Colony building, Chicago. Annual meeting, with exhibits, Hotel Sherman, Chicago, September 28, 29, 30.

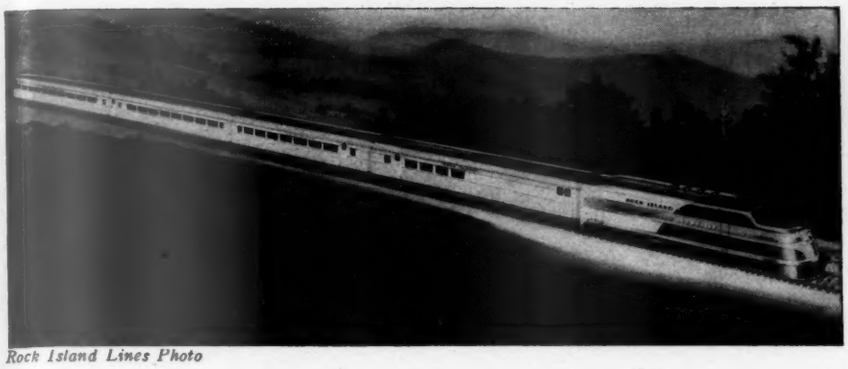
RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1941 Oliver Building, Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, Association of American Railroads. Exhibit June 16 to 23, inclusive, Atlantic City, N. J.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July and September. Annual meeting, third Thursday in November, Ansley Hotel, Atlanta, Ga.

TORONTO RAILWAY CLUB.—R. H. Burgess, Box 8, Terminal A, Toronto, Ont. Meetings, fourth Monday of each month, except June, July and August, at Royal York Hotel, Toronto, Ont.

TRAVELING ENGINEERS' ASSOCIATION.—See Railway Fuel and Traveling Engineers' Association.

WESTERN RAILWAY CLUB.—C. L. Emerson, executive secretary, 822 Straus Building, Chicago. Regular meetings, third Monday in each month, except June, July, August and September.



Rock Island Lines Photo

An artist's sketch of one of the "Rockets" being constructed by the Edward G. Budd Manufacturing Company for the Chicago, Rock Island & Pacific

NEWS

Swedish Turbine Locomotive—A Correction

THE tonnage hauled by the turbine locomotives on the Grangesberg-Oxelosund Railways in Sweden is 1,750 tons on 1 per cent ruling grades and not 750 tons as given in the item on page 46 of the January issue.

Conventional Steel Coaches Rebuilt for New Royal Blue

THE Baltimore & Ohio placed in service on April 25 an eight-car streamline train which has taken the name of the Royal Blue and operates on the same schedule as the original train of that name, leaving New York in the morning for early afternoon arrival in Washington and starting the return run from Washington at 3:45 p.m. The train, which consists of a combination smoker-baggage, four coaches, a diner and a chair car and observation car, was designed and the cars rebuilt at the Mt. Clare shops of the B. & O., Baltimore.

A feature of three of the four coaches in the train is the unusually large lounge and smoking rooms for women, which are adjacent to the lavatory. One coach has a lunch counter. The dining car is divided into two compartments, one serving as a regular diner and the other, which seats 10 people, furnishing counter service. Furnishings are bright in color.

The standard-weight steel coaches which comprise the new train have been fitted with roofs of oval section, eliminating the clerestory, and, except for the rear end of the last car in the train, without hoods. The space between the ends of adjoining cars is closed by diaphragms which conform to the roof and side contour so that the train presents unbroken roof and side surfaces from end to end. The sides have been extended downward in an inwardly curving skirting which partially conceals the equipment mounted underneath the car, and the step wells are so enclosed that the surfaces of the sides of the car are unbroken when the vestibule trap doors are closed. The cars are carried on six-wheel rubber-insulated trucks, such as have been in service on the road for several years. The equipment includes O-B tight-lock couplers similar to those on the original light-weight Royal Blue cars.

Labor Act Upheld

THE Supreme Court, in a unanimous opinion read by Justice Stone, on March 29, upheld the constitutionality of the Railway Labor Act as amended in 1934 and declared that the act applied to back-shop mechanical workers of a railroad. The case was brought by the Virginian against the System Federation No. 40. The railroad had contended that the back-shop mechanical men who were engaged in building and repairing cars and locomotives were not engaged in interstate commerce. The court held that since the men were working on equipment which was to be used to haul interstate traffic, they were definitely engaged in interstate commerce. The decision also upholds the validity of the National Mediation Board certificate designating System Federation 40 as the duly accredited representative of the back-shop employees.

The court found "no answer" in the railroad's contention that it could close its shops and turn over the repair work to contractors. This, it is conceded, "is a question of railroad management," but it is nevertheless held that the road's determination to do its own repairs has brought its relations with shop employees within the purview of the Railway Labor Act.

On the question of the validity of the National Mediation Board certificate the court discussed the railroad's contention that a majority of those eligible to vote must favor a union before the latter may be accredited. System Federation 40 received the certificate after it was favored by a majority of those voting. The court in this connection notes that the law confers the right of determination on a ma-

Rear end of the new Royal Blue of the Baltimore & Ohio

jority of those eligible to vote "but is silent as to the manner in which that right shall be exercised." It proceeds to cite cases wherein election laws have been generally construed as requiring only the consent "of the specified majority of those participating in the election," quoting one of the cited authority to the effect that those who do not participate "are presumed to assent to the expressed will of the majority of those voting." The court also notes that "the absence of eligible voters may be due less to their indifference than to coercion by the employer."

New Equipment Orders and Inquiries Announced Since the Closing of the April Issue

Locomotive Orders

Road	No. of locos.	Type of loco.	Builder
Aliquippa & Southern	2	0-8-0	American Locomotive Co.
A. C. L.	12	4-8-4	Baldwin Locomotive Works
Bangor & Aroostook	5	2-8-0	American Locomotive Co.
C. R. I. & P.	10 [1]	600-hp. Diesel-elec. switch.	Electro-Motive Corp.
Grt. Western	1	2-8-0	American Locomotive Co.
Mo. Pac.	4 [2]	600-hp. Diesel-elec. switch.	Electro-Motive Corp.
	2 [2]	900-hp. Diesel-elec.	Electro-Motive Corp.
M. St. P. & S. Ste. M.	4	4-8-4	Lima Locomotive Works
Nat'l Rys. of Mexico	8 [3]	2-6-6-2	American Locomotive Co.
	10 [3]	4-6-4	American Locomotive Co.
Pennsylvania	11 [4]	Elec.-loco. chasses	Company shops
R. F. & P.	6	4-8-4	Baldwin Locomotive Works
St. L.-S. F.	16	.....	Company shops
Youngstown & Northern	1	0-6-0	Lima Locomotive Works

Locomotive Inquiries

Alton & Southern	1 or 2	2-8-2	.....
Chinese Ministry of Rys.	40–65	2-8-2	.....
	10	2-8-4	.....

Freight-Car Orders

Road	No. of cars	Type of car	Builder
A. C. L.	100	Phosphate	Bethlehem Steel Co.
	400	Box	Mt. Vernon Car Mfg. Co.
	200	Automobile	Mt. Vernon Car Mfg. Co.
Birmingham-Southern	25	70-ton gondola	Pullman-Standard Car Mfg. Co.
C. B. & Q.	25	70-ton gondola	Pullman-Standard Car Mfg. Co.
C. M. St. P. & P.	500	50-ton steel hopper	Company shops
	500	50-ton automobile	Company shops
	1,000	Gondola	Company shops
	22	Air dump	Company shops
C. N. O. & T. P.	1,250 [5]	50-ton H. S. gondola	American Car & Foundry Co.
	2,059 [5]	40-ton box	Pullman-Standard Car Mfg. Co.
	250 [5]	50-ton L. S. gondola	Pullman-Standard Car Mfg. Co.
	500 [5]	40-ton box	Mt. Vernon Car Mfg. Co.
	500 [5]	40-ton automobile	Mt. Vernon Car Mfg. Co.
	1,100 [5]	50-ton hopper	Pressed Steel Car Co.
Lake Superior & Ishpeming	300	Ore	Bethlehem Steel Co.
L. & N. E.	75	70-ton covered hopper	American Car & Foundry Co.
Louisiana & Arkansas	50 [6]	Box	Pullman-Standard Car Mfg. Co.
	50	70-ton steel hopper	General American Trans. Corp.
M. St. P. & S. Ste. M.	250 [7]	Automobile	Pullman-Standard Car Mfg. Co.
	100 [7]	General service	Pullman-Standard Car Mfg. Co.
	100 [7]	Hopper	Pullman-Standard Car Mfg. Co.
	100 [7]	50-ton Rodger ballast	American Car & Foundry Co.
Nat'l Rys. of Mexico	250	30-ton narrow-gage box	Pullman-Standard Car Mfg. Co.
	150	50-ton std.-gage box	Pullman-Standard Car Mfg. Co.
	250 sets	of 40-ton std.-gage trucks	Pullman-Standard Car Mfg. Co.
	175	Std.-gage box	American Car & Foundry Co.
	175	Std.-gage box	General American Trans. Corp.
Pennsylvania	1,500 [4]	Box	Company shops
	1,000 [4]	Gondolas	Company shops
	300 [4]	Covered hopper	Company shops
Tenn. Coal, Iron & R. R. Co.	19	70-ton ore	Pullman-Standard Car Mfg. Co.
	21	70-ton gondola	Pullman-Standard Car Mfg. Co.

Freight-Car Inquiries

Union Pacific	750-3,000 [8]	.....	.....
	1,000	50-ton gondolas	.....

Passenger-Car Orders

Road	No. of locos.	Type of loco.	Builder
A. C. L.	20	Coaches	Bethlehem Steel Co.
	15	Express	Bethlehem Steel Co.
Can. Nat'l	50 [9]	Coaches	Canadian Car & Foundry Co.
C. M. St. P. & P. [10]	7	Diners	Company shops
	1	Mail-express	Company shops
	5	Coach-baggage	Company shops
N. & W.	9	Postal	Bethlehem Steel Co.

Passenger-Car Inquiries

G. T. W.	3	Baggage	.....

[1] The Rock Island has been authorized by the Federal District Court at Chicago to lease for 7 years, with the right to purchase, ten 100-ton 600-hp. Diesel-electric switching locomotives from the Electro-Motive Corporation. These locomotives, having a value of $700,000, will probably be used at Des Moines, Iowa; Kansas City, Mo.; Peoria, Rock Island, Joliet and Chicago, Ill.

[2] The 600-hp. locomotives are for use at various points, and the two 900-hp. for use between St. Louis, Mo., and Kansas City.

[3] The eight articulated locomotives of the 2-6-6-2 type to have 18-in. by 30-in. cylinders and weigh 410,000 lb. in working order and the 10 locomotives of the 4-6-4 type, to have 22½-in. by 28-in. cylinders and weigh 300,000 lb. in working order.

[4] The cars include 1,000 double-door box, 50 ft. long, adapted to the transportation of general freight including automobiles; 1,500 mill-type gondola cars, 52 ft. long and of 70 tons' capacity, and 300 covered hopper cars for carrying, in bulk, cement and other commodities requiring protection from the weather. The 11 new electric passenger locomotives are to be of the G. G. 1 type. These locomotives will be assembled at Altoona, with electrical parts supplied by the electrical manufacturing companies. The total cost of this equipment is estimated at $10,750,000.

[5] Of these, 1,000 box, 250 low-side gondola, 250 high-side gondola and 600 hopper, a total of 2,100 cars, are for service on the Alabama Great Southern, and the other 3,500 cars are for service on the Cincinnati, New Orleans & Texas Pacific.

[6] In addition to 100 reported ordered from Pullman-Standard in March issue.

[7] For the Wisconsin Central.

[8] For use in preparing appropriations.

[9] These coaches will be air-conditioned and will have a seating capacity of 64, reclining seats, high tensile steel bodies, turtle back roof, and six wheel trucks.

[10] An order has also been placed with company shops for the modernization and air conditioning of 30 coaches.

"Forty-Niner" to Augment "City of San Francisco"

A NEW steam train, which will be known as the "Forty-Niner" and the schedule of which will be staggered with that of the Streamliner City of San Francisco, will be placed in service between Chicago and San Francisco by the Chicago & North Western, the Union Pacific and the Southern Pacific about June 15. The train will be operated on a schedule of 50 hr. 42 min. westbound, and 49 hr. eastbound, for the 2,260 miles, the latter time being the basis for the train's name. It will leave Chicago at 10:10 a.m. on the 2, 8, 14, 20 and 26th days of each month, and will arrive in San Francisco at 10:52 a.m. the third morning. Returning it will leave San Francisco shortly before noon on the 5, 11, 17, 23 and 29th days of each month.

The Forty-Niner, drawn by a steam locomotive, will be an eight-car train, air-conditioned throughout, with sections, drawing rooms, compartments and single and double bedrooms, lounge accommodations and barber shop, the capacity of all accommodations being adequate for 115 persons. An extra fare of $10 will be charged. The standard Pullman cars in the train will have rounded roofs, so that, in combination with the two-car, light-weight, articulated units Advanced and Progress, which the Pullman Company introduced last September, the train will be of streamliner design. In this two-car unit, which will be located at the rear of the train, the head car, of duplex style, consists of 16 single bedrooms, 7 of which are upstairs, and the remainder on the regular level, or downstairs. The rear car contains rooms, buffet and lounge, the forward half being given over to three double bedrooms and one compartment. A buffet will serve light refreshments, and the lounge, taking up one half of the car, will seat 26 persons.

Railway Strike Threat Ended in Canada

DURING the week ended April 3 organized Canadian railwaymen, 117,000 strong, and managements of the two Canadian railways in Montreal reached an agreement on a plan for restoration of wage cuts which removed the threat of a tie-up in the Dominion's transportation.

Members of the 18 standard unions will have the entire deduction returned to them in ten progressive steps within the next year.

The pact terminated a controversy which began in March, 1935, when union officers applied for a board of conciliation to weigh their request for return of a 10 per cent cut in wages voluntarily accepted by employees early in 1932. It also dispelled a threat of a paralyzing strike which loomed since early in February when union leaders flatly rejected the majority report of the conciliation board, which ended several months of deliberations by recommending that railways give their employees three per cent of the ten per cent deduction in serrated steps before the year's end.

(Continued on next left-hand page)

The Labor Department in Ottawa has more recently announced that a board of conciliation had recommended restoration by next April 1 of 10 per cent wage deductions to about 10,000 Canadian National employees, members of the Canadian Brotherhood of Railway Employees.

The board, in a unanimous finding, recommended, in effect, the same treatment of these employees in the matter of pay restoration as the railways will accord members of the standard labor organizations.

Burlington Streamline Steam Locomotive Completed

THE first of two streamline steam locomotives, in which reciprocating parts are designed to meet the demands of high-speed operation, has been completed in the West Burlington, Iowa, shops of the Chicago, Burlington & Quincy, and, after a series of road tests, will be placed in regular service as a relief locomotive on the Zephyr runs between Chicago and Denver, Colo., between Chicago and the Twin Cities, and in other high speed passenger service. At ceremonies held at the shops on April 11 and attended by 5,000 people, the first locomotive was christened "Aeolus." The name, taken from Greek Mythology, means "keeper of the winds." The stainless-steel sheets which encase the locomotive and tender give the locomotive an appearance similar to that of the Zephyrs. The Aeolus, a 4-6-4 type locomotive, burns coal and is capable of speeds of more than 100 miles an hour. Because of the design of reciprocating parts, the destructive effect on the track will be less than that of conventional locomotives operating at high speeds.

I. C. C. Authorizes Construction of Fusion-Welded Tank Cars

THE Interstate Commerce Commission, Division 3, has authorized the construction for experimental service of 55 tank cars, to be fabricated by the fusion-welding process, in addition to those authorized last year as referred to in an item on page 273 of the June, 1936, issue of the *Railway Mechanical Engineer*. The decision grants the application of the General American Transportation Corporation for permission to build 50 such cars for the transportation of petroleum products; that of the E. I. duPont de Nemours & Company for authority to build one for the transportation of nitric acid; and that of the Texas Chemical Company for permission to construct four for the transportation of muriatic acid. Also service restrictions applied to a car previously constructed by the duPont company are removed and no such limitations as to operation between specific points and over specified routes are to be applied to that company's new car.

The 50 General American cars will conform with I.C.C. specification 105-A-300, except that the tanks will be fusion welded instead of forge welded, in compliance with proposed revised I.C.C. specification 105-A-300-W. The duPont car will conform with I.C.C. specification 103-C, except that the tank will be constructed by fusion welding instead of riveting and caulking, and will be marked in compliance with proposed revised specification 103-C-W. The four Texas Company cars will conform with I.C.C. specification 103-B, except that fusion welding will be employed instead of riveting and caulking, in compliance with proposed revised I.C.C. specification 103-B-W.

Reading To Purchase Train

THE Reading has authorized the purchase of a train of standard lightweight equipment to be built by the Edward G. Budd Manufacturing Company of stainless steel. The train will be operated between Philadelphia and New York by a streamline Pacific type steam locomotive.

Supply Trade Notes

L. A. BEDARD has been appointed manager of sales of the Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill.

THE DEVILBISS COMPANY, Toledo, Ohio, will erect a new plant, 120 ft. by 440 ft., on Lagrange street near the Ottawa river, Toledo, to expand its rubber products division.

THE LINDE AIR PRODUCTS COMPANY, unit of Union Carbide and Carbon Corporation, has opened an oxygen plant on Powhattan avenue, Essington, Pa. A Prest-O-Lite acetylene plant has been opened at 2330 Armistead Bridge Rd., Norfolk, Va.

LEO F. DUFFY, formerly of the western railroad sales department of the Chicago Pneumatic Tool Company, has joined the sales organization of the Youngstown Steel Door Company and the Camel Sales Company, at Chicago.

THE CARBOLOY COMPANY, INC., Detroit, Mich., has added P. H. Holton to the sales engineering personnel of the Philadelphia territory. Mr. Schonberger, formerly of the Philadelphia territory, has been transferred to Newark, N. J.

FRANK L. JOHNSON has been appointed vice-president in charge of sales and operations of the western district of the Pressed Steel Car Company, Inc., with headquarters at Chicago. Mr. Johnson was born in Chicago, where he attended elementary schools and college. He entered the employ of the Pressed Steel Car Company, in the engineering department, at Chicago, in 1906 and on January 1, 1913, was transferred to the western district sales department as sales agent. In January, 1928, he was promoted to the position of assistant general sales manager, western district, and in July, 1933, to general sales manager, western district. Since February, 1934, Mr. Johnson has served as vice-president of the Pressed Steel Car Company of Illinois.

ROLAND W. BURT has been appointed eastern manager of railroad sales for Joseph T. Ryerson & Son, Inc., with headquarters at the Jersey City, N. J., office of the company. Mr. Burt has been with the Ryerson company for 14 years, advancing through its various sales divisions to the position of sales representative in the state of Indiana. Later Mr. Burt took charge of railroad sales at St. Louis, Mo.

(c) Kochne

Roland W. Burt

THOMAS W. DELANTY, manager of eastern railroad sales for Joseph T. Ryerson & Son, Inc., who has been representing that company in a sales capacity both in this country and in the Far East since 1918, has resigned to become associated vice-president of the Ajax Hand Brake Company, with headquarters at Chicago.

L. J. REAY has been appointed president of the Mahr Manufacturing Company, manufacturing division of the Diamond Iron Works, Inc., Minneapolis, Minn. G. A. Bingenheimer, formerly president, has become chairman of the board. Other members of the Executive council include W. G. Barstow, vice-president in charge of general business promotion, and his assistant, O. E. Ertl; W. H. Ridell, secretary and treasurer, and C. F. Olmstead, Chief engineer.

CRAIG W. MARSHALL has been appointed district manager, eastern territory, railroad division of The Dayton Rubber Manufacturing Company, with headquarters at 11 Park Place, New York City. He succeeds E. J. Schmidt, who has been transferred to the home office division, where he will act in an executive sales engineering capacity. Mr. Marshall has been associated for the past 11 years with the Sunbeam Electric Manufacturing Company, as eastern sales manager of railroad equipment.

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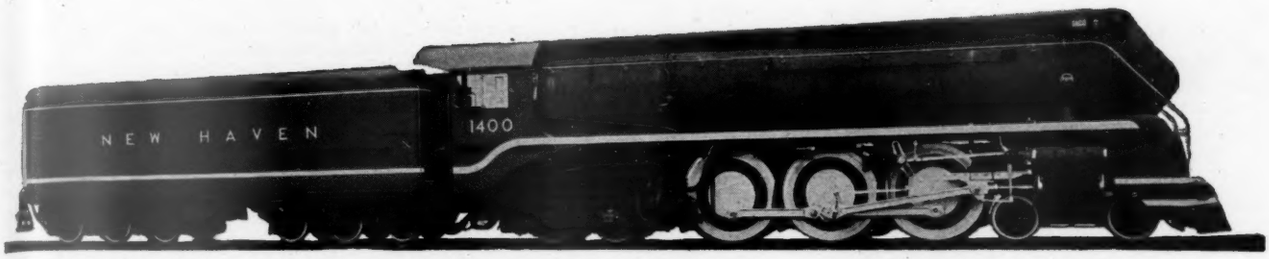


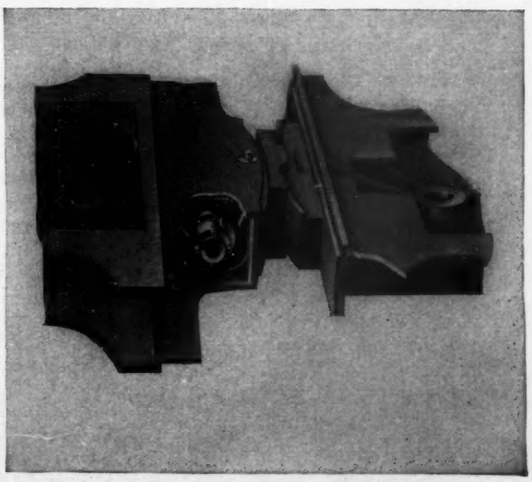
POWER
designed for
HIGH SPEED DE LUXE SERVICE

On these ten 4-6-4 Type Streamlined Passenger locomotives built by Baldwin for The New York, New Haven and Hartford Railroad Company, the Type E-2 Radial Buffer between engine and tender will aid in smooth operation and improve the riding of the locomotive.

The Franklin Type E-2 Radial Buffer maintains a pre-determined spring-held, frictional resistance between engine and tender that avoids all slack, yet permits free movement in any direction between engine and tender units.

This controlled frictional resistance dampens all oscillation and cushions and absorbs the shocks.

By avoiding slack and jar it protects against excessive stress on drawbar and pins, increases safety of operation and adds to passenger comfort by improving the smoothness of the entire train movement.



Franklin Type E-2 Radial Buffer

Because material and tolerances are just right for the job, genuine Franklin repair parts give maximum service life.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

W. J. MONTGOMERY of the Sherwin-Williams Company, Cleveland, Ohio, has been appointed general manager of transportation sales. Mr. Montgomery, who succeeded K. H. Wood, now vice-president and general sales manager for the company, has for some years served as assistant manager of transportation sales.

J. E. PETERSON has been elected vice-president and assistant to the president of the General Machinery Corporation. Mr. Peterson has his headquarters at Hamilton, Ohio. He has been with the company 22 years, having joined the Hooven, Owens, Rentschler Company, a division of the General Machinery Corporation, in 1914.

THE TIMKEN ROLLER BEARING COMPANY, Canton, Ohio, has appointed district managers in charge of steel sales for its Steel and Tube Division as follows; W. F. Anderson, St. Louis, Mo.; M. C. Bellamy, Seattle, Wash.; G. W. Curtis, Milwaukee, Wis.; H. V. Fleming, Birmingham, Ala.; B. E. Keifer, Cincinnati, Ohio; H. D. Robb, Pittsburgh, Pa., and B. M. Tinlin, Huntington, W. Va.

THE HOMESTEAD VALVE MANUFACTURING CO., INC., Hypressure Jenney Division, Corapolis, Pa., has appointed the following distributors for handling exclusively its line of chemical vapor-spray-cleaning machines: Toledo Equipment & Supply Co., 1007 Jefferson avenue, Toledo, Ohio; Oil Burner Equipment Co., 502 Lafayette street, Tampa, Fla.; Merkel & Roberts, 478 E. Erie street, Painesville, Ohio, and Gleasner Corporation, 217 Leroy avenue, Buffalo, N. Y.

WALTER J. TAFT, who has been a member of the editorial staff of Railway Age in New York for the past nine years, took charge of the Washington editorial office of the Simmons-Boardman publications on April 17. Mr. Taft's experience with the Simmons-Boardman Publishing Corporation has been primarily in the handling of general news assignments for the Railway Age—both from an editorial and reportorial standpoint. He is thoroughly familiar with the literature on all aspects of railroads—rate questions, regulation and labor matters in particular. He came to the Simmons-Boardman Publishing Corporation in April, 1928, having already had both railroad and newspaper experience. Born on July 29, 1902 at Glendale, R. I., he attended public school at Pascoag, R. I., and the LaSalle Academy at Providence. He received his A.B degree from Providence College in 1924. In 1924-25 he was a reporter for the Providence Evening Tribune. In 1925-27 he attended the Harvard Business School (taking Professor Cunningham's courses in railroad transportation), from which institution he was graduated in the latter year with the degree of Master of Business Administration. In the summer of 1926, Mr. Taft worked in the accounting office of the New Haven at Harlem river, New York. From July to December, 1927, he was a clerk in the engineering department of the Bangor & Aroostock at Houlton, Me. From January to April, 1928, he was a statistician in the service of the Boston & Maine at Boston, which position he left to join the staff of Railway Age.

W. J. Taft

THE ELLCON COMPANY, New York, and the Wellman Bronze & Aluminum Company, Cleveland, Ohio, have combined their sales and manufacturing activities. The Wellman Bronze & Aluminum Company will, in addition to its products, manufacture those heretofore produced by The Ellcon Company, and direct the sale of these products from Cleveland west. The Ellcon Company will handle the sales of both companies, maintaining its present sales office at 50 Church street, New York, covering the district east of Buffalo, N. Y., and Pittsburgh, Pa., south.

THE AMERICAN BRAKE SHOE & FOUNDRY COMPANY, New York, has consolidated the American Forge Company and the Southern Wheel Company with the parent company. These are now known as the American Forge and Southern Wheel Divisions, respectively, of The American Brake Shoe & Foundry Company. Consolidation of certain other subsidiary companies, and their organizations as divisions of The American Brake Shoe & Foundry Company, will take place as fast as is practicable. In line with this program of creating a division which is devoted to the production and sale of a particular line of products, the Brake Shoe Division has recently been created. This division produces, in addition to brake shoes, certain miscellaneous iron castings. Maurice N. Trainer, vice-president, has been placed in charge of the Brake Shoe Division and all departments of this division now report to him. The American Brake Shoe & Foundry Company and its Southern Wheel Division has moved the St. Louis sales office to the Railway Exchange building, St. Louis, Mo. O. W. Spencer will represent both companies at St. Louis.

O. J. PARKS has been appointed general superintendent of the tank-car-repair department of the General American Transportation Corporation, with headquarters in Chicago, to succeed I. A. Eakins, who has retired after many years' service with the General American Company. Mr. Parks was employed by the Pennsylvania railroad in its car department prior to coming to the General American Transportation Corporation 22 years ago, since which time he has served as general superintendent and manager of sales in the freight car department. He is now taking over the supervision of maintenance of all tank cars of the company. Richard M. Lamport has been appointed sales representative, with headquarters in Chicago, to assist in the sales of freight cars and special car equipment. Mr. Lamport came to the company five years ago, after his graduation from Boudoin college.

Obituary

FRANK F. KISTER, chairman of the board of directors of the Q & C Company, New York, died on April 5, at his home in Brooklyn, N. Y., at the age of 64 years. Mr. Kister had served for 45 years with this company, and for more than 20 years was its president and treasurer.

PAUL W. DIETER, inventor and president of the Dieter Bearings Corporation and the Standard Safety Nut Corporation, died on April 5, at the Fifth Avenue Hotel, New York. Mr. Dieter was born at Springfield, Ohio, 53 years ago, and had been in the railroad supply business for about 30 years. Five years ago he patented the Dieter bearing, a journal bearing for locomotives and cars. He also devised various forms of lock nuts, a floating bearing for locomotives, hose fixtures and other items.

EDWARD M. SAWYER, formerly a railroad man, and for many years general manager of the railroad department of the International Correspondence Schools, Scranton, Pa., died in that city on April 20, at the age of 74 years. He was a native of Canada and began his railroad career in 1887 as a fireman on the Canadian Pacific; since 1899 he had been associated with the International Correspondence Schools. He was a member of the Air-Brake Association, International Railway Fuel Association, and a number of railroad clubs.

WILLIAM C. HEDGCOCK, chief mechanical engineer of the American Steel Foundries, died on April 18 at Evanston, Ill., of leucocythemia. He was born in 1889 at Jeffersonville, Ind., and entered the employ of the Louisville & Nashville as a blueprint boy, from which position he progressed to assistant mechanical engineer. Later he became mechanical engineer of the Chicago, Indianapolis & Louisville at Lafayette, Ind. In 1913 he entered the engineering department of the American Steel Foundries. Immediately upon the declaration of war, he enlisted in the Ordnance department and was assigned to staff duty in Washington, achieving the rank of major in the Ordnance design division. After the war he returned to the employ of the American Steel Foundries and in 1929 was appointed chief mechanical engineer, which position he held until his death.

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Personal Mention

General

L. B. JONES, master mechanic of the Columbus, Cincinnati and Toledo divisions of the Pennsylvania, has been appointed engineer of tests at Altoona, succeeding F. M. Waring.

C. K. STEINS, master mechanic of the Maryland and Baltimore divisions of the Pennsylvania at Wilmington, Del., has been appointed assistant chief of motive power (locomotives), with headquarters at Philadelphia, Pa.

C. T. HUNT, acting assistant master mechanic of the Pennsylvania at Wilmington, Del., has been appointed assistant engineer motive power, office of superintendent of motive power, Southern division.

A. O. GEERTZ, assistant master mechanic of the Pennsylvania at Altoona, Pa., has been appointed assistant engineer motive power, office of superintendent of motive power, Western Pennsylvania division.

F. M. WARING, engineer of tests of the Pennsylvania at the Altoona, Pa., Works, has been appointed resident inspector, test department, with headquarters at Philadelphia, succeeding W. R. Garden, retired.

R. G. MCANDREW, mechanical engineer of the New York, Ontario & Western, has been appointed superintendent of motive power, with headquarters as before at Middletown, N. Y., succeeding B. P. Flory,

R. G. McAndrew

who has retired. Mr. McAndrew was born on February 25, 1895, at St. Thomas, Ont. He was graduated from the University of Michigan (B.S.M.E.) and entered railroad service in 1916 as special apprentice with the Michigan Central. From 1919 to 1923 Mr. McAndrew served as an enginehouse foreman of the Michigan Central and from 1923 to 1928 was drafting, testing and enginehouse foreman of the Denver & Rio Grande Western. He was appointed mechanical engineer of the New York, Ontario & Western in 1929.

L. W. DOWNEY, who has been connected with the Electro-Motive Corporation, La Grange, Ill., has been appointed to the newly-created position of supervisor of automotive equipment of the Chicago, Rock Island & Pacific, with headquarters at Chicago. Mr. Downey will have direct jurisdiction over the maintenance of Diesel and other automotive equipment.

BURTON P. FLORY, superintendent of motive power of the New York, Ontario & Western, with headquarters at Middletown, N. Y., has retired. Mr. Flory was

B. P. Flory

born on November 9, 1873, at Susquehanna, Pa., and was graduated from Cornell University in 1895, with a degree in mechanical engineering. He entered railroad service in September, 1899, with the Lehigh Valley and served as inspector and mechanical engineer until 1904, when he became mechanical engineer of the Central of New Jersey. He served in the latter capacity until January 1, 1909, when he was appointed superintendent of motive power of the New York, Ontario & Western at Middletown. Mr. Flory is a past president of the New York Railroad Club and a member of the American Society of Mechanical Engineers and the American Society for Testing Materials.

Master Mechanics and Road Foremen

C. A. WILSON, master mechanic of the Atlantic division of the Pennsylvania, has been appointed master mechanic of the Williamsport division.

H. T. COVER, master mechanic of the Eastern division of the Pennsylvania, has been appointed master mechanic of the Maryland and Baltimore divisions.

J. L. MARKS, enginehouse foreman of the Pennsylvania, has been appointed assistant master mechanic of the Middle division.

R. J. CONRAD, enginehouse foreman of the Pennsylvania, has been appointed assistant master mechanic of the Philadelphia division.

A. W. BYRON, master mechanic of the Williamsport division of the Pennsylvania, has been appointed master mechanic of the Philadelphia Terminal division.

C. A. SHULL, master mechanic of the Philadelphia Terminal division of the Pennsylvania, has been appointed master mechanic of the Western Pennsylvania division.

J. W. LEONARD, assistant master mechanic of the Pennsylvania at Harrisburg, Pa., has been appointed master mechanic of the Atlantic division and of the Pennsylvania-Reading Seashore Lines.

J. N. FOX, general foreman at Markham yard of the Illinois Central at Chicago, has been appointed master mechanic, with headquarters at Jackson, Tenn., succeeding L. A. Kuhns, deceased.

K. L. ROBERTS, assistant road foreman of engines of the Panhandle division of the Pennsylvania, has been appointed assistant road foreman of engines, Pittsburgh division.

W. HOWARD JACKSON, shop inspector of the Norfolk & Western at Bluefield, W. Va., has been promoted to the position of assistant road foreman of engines of the Pocahontas division, succeeding H. C. Wyatt.

JAMES W. MCKINNON, who has been appointed division master mechanic of the Canadian Pacific, with headquarters at Edmonton, Alta., as noted in the March issue of the *Railway Mechanical Engineer*,

J. W. McKinnon

was born on August 29, 1891, at Kenora, Ont., and was educated at St. Mary's school Winnipeg, Man. He entered the service of the Canadian Pacific on July 15, 1908, as a machinist apprentice at the Weston shops, Winnipeg. On March 1, 1916, he was appointed shop foreman at Kenora; on March 11, 1919, night locomotive foreman; on June 14, 1919, shop foreman; on August 12, 1919, shop foreman at Fort William, Ont.; on January 1, 1922, shop foreman, locomotive shop, Winnipeg; on September 17, 1923, locomotive foreman, North Transcona, Man.; on December 27, 1923, shop foreman, locomotive shop, Winnipeg; on March 18, 1924, locomotive foreman, Broadview, Sask.; on March 28, 1924, shop foreman, Winnipeg; on October 24, 1926, locomotive foreman, North Transcona; on December 16, 1926,

shop foreman, locomotive shop, Winnipeg; on September 25, 1927, locomotive foreman, North Transcona; on January 1, 1928, shop foreman, locomotive shop, Winnipeg; on September 1, 1928, locomotive foreman, Medicine Hat, Alta.; on July 1, 1932, locomotive foreman, Winnipeg; on March 15, 1935, division master mechanic, Calgary, and on January 16, 1937, division master mechanic, Edmonton.

C. W. WHISTLER, enginehouse foreman of the Pennsylvania, has been appointed assistant master mechanic of the Maryland and Baltimore divisions.

R. J. MACNAMARA, assistant road foreman of engines and assistant trainmaster of the Wilkes-Barre division of the Pennsylvania, has been appointed assistant road foreman of engines and assistant trainmaster of the Monongahela division.

F. D. VEAZEY, general foreman of the Norfolk & Western at Columbus, Ohio, has been appointed to fill the newly created position of assistant master mechanic of the Radford and Shenandoah divisions, with headquarters at Shaffers Crossing, Roanoke, Va.

Car Department

J. O'NEAL, general car foreman of the Gulf, Mobile & Northern, has been appointed superintendent of the car department, with headquarters as before at Mobile, Ala.

E. Y. NITRAUER, division car foreman on the Erie at Marion, Ohio, has been appointed shop superintendent of the Port Jervis (N. Y.) car shop, to succeed M. H. Quinn, who has retired.

Shop and Enginehouse

ARTHUR D. O'NEILL has been appointed chief boiler inspector of the Pere Marquette, with headquarters at Grand Rapids, Mich.

A. R. REED, assistant night enginehouse foreman of the Chesapeake & Ohio at Hinton, W. Va., has been appointed night enginehouse foreman, vice P. T. Briers.

P. T. BRIERS has been appointed general foreman of the Chesapeake & Ohio, with headquarters at Charlottesville, Va., succeeding J. S. Williams.

A. G. GEBHARDT, general foreman of the Illinois Central at Twenty-seventh street, Chicago, has been appointed general foreman at Markham yard, Chicago, succeeding J. N. Fox.

J. O. GREEN has been appointed superintendent of the Frascati shops of the Gulf, Mobile & Northern and will have jurisdiction over both locomotive and car departments, with headquarters at Mobile, Ala.

HOWARD S. WEST, enginehouse foreman of the Illinois Central at Centralia, Ill., has been appointed general foreman of the enginehouse at Twenty-seventh street, Chicago, succeeding A. G. Gebhardt.

H. C. WYATT, assistant road foreman of engines of the Pocahontas division of the Norfolk & Western, at Bluefield, W. Va., has been promoted to the position of general foreman, with headquarters at Columbus, Ohio, succeeding F. D. Veazey.

FRANK BERNARD DOWNEY, who has been appointed assistant shop superintendent of the Chesapeake & Ohio at Huntington, W. Va., as noted in the April issue of the *Railway Mechanical Engineer*, was born on September 30, 1890, at Huntington. He

F. B. Downey

attended high school and Marshall College, entering the service of the C. & O. on October 1, 1907. After serving as a machinist on the C. & O. and other roads, he became assistant enginehouse foreman of the C. & O. at Russell, Ky., on October 1, 1918. On October 1, 1919, he became enginehouse foreman, and on October 1, 1920, general foreman. On October 1, 1924, he was transferred to Covington, Ky., as general foreman; on October 1, 1925, became general foreman at Huntington, and on March 1 of this year assistant shop superintendent.

Obituary

CHARLES D. POWELL, boiler foreman of the Baltimore & Ohio at Grafton, W. Va., died on February 2 following a stroke.

B. B. CLEATON, assistant division master mechanic of the Louisville & Nashville, with headquarters at Loyall, Ky., died on March 25.

JOSEPH H. NASH, who resigned in 1930 as superintendent of motive power of the Illinois Central, died at his home at Chicago on April 14 after a long illness.

JACOB E. MECHLING, formerly superintendent of motive power on the Pennsylvania, with headquarters at Indianapolis, Ind., died at this home in Indianapolis on April 15. Mr. Mechling retired in 1925.

FRANKLIN E. COOPER, superintendent of shops of the Baltimore & Ohio at Butler, Pa., died on February 7. Mr. Cooper was born at Connersville, Pa., on October 22, 1882. He entered railroad service as a machinist apprentice on the Pittsburgh & Lake Erie at Pittsburgh, Pa. Upon the completion of his apprenticeship in 1910 he became machine shop foreman and apprentice instructor. In 1916 he became general foreman of the Baltimore & Ohio at Newark, Ohio, where he worked his way up to the position of master mechanic. In 1924 he was appointed superintendent of shops at Glenwood, Pa.; five years later was transferred to Gassaway, W. Va., and in 1934 became superintendent of shops at Keyser, W. Va., where he had charge of both locomotive and car departments. On January 14 of this year he was transferred to Butler.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers. State the name and number of the bulletin or catalog desired, when mentioned in the description.

HASLER SPEED INDICATOR.—The Hasler Speed Indicator, a precision instrument for measuring machine speeds, is illustrated and described in the eight-page bulletin issued by the Hasler-Tel Company, 461 Eighth avenue, New York.

BOLTS AND NUTS.—Bulletin No. 16, issued by the Dardelet Threadlock Corporation, 205 W. Wacker Drive, Chicago, illustrates and describes Dardelet self-locking bolts and nuts for application particularly where vibration, shock and similar stresses are encountered.

J-METAL CUTTING TOOLS.—The Haynes Stellite Company, a unit of the Union Carbide and Carbon Corporation, Kokomo, Ind., has issued a 52-page booklet describing the properties and economies of J-Metal and presenting data on the recommended procedures for its use. A section on Haynes Stellite welding rod describes the advantages derived from hard-facing wearing parts of machine-shop equipment.

EASY-FLO BRAZING ALLOY.—Easy-Flo, a brazing alloy which works equally well on both ferrous and non-ferrous metals—stainless steel, monel metal, chrome-nickel and copper-nickel alloys, etc.—is described in the four-page bulletin issued by Handy & Harman, 82 Fulton street, New York.

LANDIS CHECK BOOK.—"Bank on Landis for Savings" is the title of the unique book of threading costs and production records issued by The Landis Machine Company, Waynesboro, Pa., for users of thread cutting and tapping equipment. Each "check" in the book is numbered and, for each job, gives the name of part; equipment and material used; material hardness; production; cutting speed, etc. Should additional data be desired, the check stub with the corresponding job number can be filled in and sent to the Landis Company.